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PEDIATRIC PSYCHOLOGY AND THE CHILD GUIDANCE MOVEMENT

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THE fact that a psychiatric society has asked a pediatrician to address it would seem a hopeful symptom in these rather troubled times. It apparently recognizes the need for sympathetic cooperation between the psychiatrist and the pediatrician, each approaching the same problem from a different angle, in the hope that they can meet on common ground in a spirit of mutual helpfulness. That a speaker for such an occasion should be chosen who has no special interest in formal child psychology and psychiatry and who has had even less formal training needs explanation. There are naturally two normal approaches to the acquisition of useful knowledge of child psychology and psychiatry—that of the psychologist and the psychiatrist from without, that of the pediatrician and family doctor from within. To insure normal, safe progress the contributions of each should be welcomed by the other as complemental to his own, as is done in analogous situations in medicine. My present concern, then, is to meet the request of your president to present a pediatrician's viewpoint and reaction to the current widespread interest and activity in the field of child psychology and psychiatry, with the hope that it will stimulate discussion that may help to clarify a matter that, I think, seems a bit confused to all of us. I shall try to tell you how the matter looks to one who is neither psychologist nor psychiatrist, but who for many years has been interested in the practical observation, interpretation, evaluation and therapy of mental processes, reactions and behavior in children as one constantly and necessarily encounters them in pediatric practice in the home, in one's own family, and in the ordinary social contacts of life. In doing this I shall stress especially the in-

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evitable lay reaction to such movements that experience with analogous situations can confidently lead us to expect in this instance. I have chosen the broad title of "Pediatric Psychology" to include all of the psychologic reactions that the pediatrician or family physician encounters in practice, with which he alone has a first-hand familiarity, and that have an important bearing in this connection.

Perhaps you will pardon me for introducing a personal matter, both because it was doubtless back of the invitation that has brought me here, and also because it will help to visualize rather concretely some of the aspects of the present status of the psychiatric situation. Two years ago I was invited to address the New England Pediatric Society in Boston. To those of us in the hinterland of culture an invitation from that source is a command. I proposed several pediatric subjects and as a sort of afterthought I mentioned "The Menace of Psychiatry." That subject was chosen at once. That was somewhat encouraging but also somewhat terrifying. I had long had some vague subliminal ideas on the subject that had never come to full consciousness, and a few very decided convictions. I was apprehensive about being able to express what had hitherto been inarticulate and I feebly tried to get out of it. Between my own real inclination, however, and further encouragement from a high and authoritative pediatric source I was jockeyed into going. I went, but like Paul before the Corinthians, "in weakness, and in fear, and in much trembling." I am still bewildered at the reception accorded that paper at the time and subsequently. I am inclined to believe that if I read to you the several hundred letters that I received from pediatricians, general practitioners, laymen, psychiatrists, nearly all of them asking for several reprints to distribute at strategic points, it would give you a better insight into the whole subject than I can in any other way. A well-known publisher asked me to expand and mould the paper into a book, evidently thinking that there was enough question about the present trend of things to make a warning and a protest convertible into dollars and cents. When I declined because among other reasons it would seem illogical to add one more small item to a confusion that already seemed to exist, he suggested that what was needed was "a book to stop more books." An eminent English pediatrician wrote me: "I have just read with much approval your paper on the Vis Medicatrix Naturae and The Menace of Psychiatry. I find myself so much in sympathy with your point of view that I am venturing to send you two reprints of my own in which the same sort of doctrine is preached. It is badly needed in this country though not so badly, I fancy, as in yours." Among others came a letter from your president, asking me as a pediatrician to state my "views concerning some of the newer psychiatric vogues in their relation to pediatrics." When he added

that my former address "was read with great pleasure" and that in it I had "struck a note which was very responsive" I readily accepted the invitation. I am not citing all this because I have any false notions as to the intrinsic value of that paper. It was a jumble of things with many angles, some one of which was bound to hit some one favorably, and people love to see their own views in print. Unfavorable reactions, too, were probably not expressed as freely as the others. And yet it gives one "pause to think."

Even without such evidence I think it is rather clear to all of us that there is some confusion and not a little bewilderment in the child psychiatry world, today. That things will get worse for a time I think one can safely predict. That not a little harm will come for a time, but more final good, can be expected with calm assurance. There is nothing unique about the present wave of activity. The history of medicine is largely a history of the rise and fall, often only the decline, of such movements. Pediatrics has had more than its share. The present epidemic, to change the metaphor, has apparently assumed pandemic proportions. It is probably more virulent in this country than elsewhere because it has fallen on virgin soil.

The question naturally arises why does such a movement arise, or gain a greater momentum at a given time as compared with some other time. I think the answer is not hard to find in the present instance, and in that answer lies the source of nearly all our troubles. Probably in nearly every age to which human records bear witness each receding generation has thought that the oncoming generation was living at a new and perilous pace. Even pastoral Concord of the forties was too much for Thoreau and he moved to Walden Pond. In spite of this I think one can safely say that there has been no previous epoch in the history of the world in which such momentous changes in man's environment and in his whole resulting mode of living have followed one another in such quick succession as in the present epoch. No discussion of the movement under consideration can fail to take cognizance of this as a fundamental factor in its genesis. The machine age does not interest us now in the sense of looms, cotton gins, steel mills, or big business, so much as in the fact that it has suddenly made a tremendously complicated, nerve taxing, high tension, raucous world on the one hand, and an enormously expanded and paradoxical as it may seem, contracted world on the other hand. Within a generation, or two, distances have been annihilated. In that short space of time the steam engine, the gasoline engine, gas and electricity in all its phases, have contributed each from a new angle to give full measure to the complexity and speed, and noise, and danger, and wideness of interest of life. In that short space of time we have had to adapt ourselves from a simple, almost pastoral life to one that is a seething

maelstrom of activity. There is no longer any unbroken peace and quiet and leisure. The telephone, the automobile, the radio and the doorbell have seen to that. Life has become dynamic, instead of static, or a wholesome mixture of the two. The business man knows from statistics that competition has made the chances of success numerically against him, and that adds to the "tumult and the strife." The machine has broadened our interests and widened our knowledge but it has left us little leisure to think and to acquire wisdom. Our pleasures are so multiplied and so easily accessible that the keenness has gone out of them. We have forgotten or have never known that it is the paucity, not the multiplicity, of pleasures that gives them zest and makes life enjoyable. I called one Christmas morning to see a poor little rich girl of six or seven years. The Christmas tree was so tall that it had to bend over, and the room looked like the toy shop at Field's or Wanamaker's. The little girl was so bored that she yawned. About the same time there appeared a cartoon of McCutcheon's, with the legend "The Toy She Loved Best," showing a little girl on Christmas morning hugging a rag doll labeled "from the Janitor." A few years ago a foolish rich mother who surrounded her five-year-old daughter with every luxury said to her one day, "Oh! see the aeroplane." The little girl did not even look up, and said, "Why should I look at it. I'll see those all my life." It was once the children of the rich only who had everything and became blasé before their time and demanded ever new pleasures, often to their ruin; today a child does not have to be rich to be overstimulated and then palled by a multiplicity of pleasures and activities. It is one of the common experiences for little children who have an overabundance of opportunity for amusement to get bored and to say to their mothers, "What will I do now?" or "There isn't a thing to do that's any fun."

The radio and the movie are doing their full share in adding to the complexity of domestic life. Why should a child study when he, or rather, she, can hear Rudy Valee crooning on the radio, or why not combine the two? Why not go to the movie, and often, when it costs so little and is just around the corner? If the mother is a bit old-fashioned and thinks that "Stepping Sisters," or "Ladies of the Big House," or "Lady With a Past," or "Her Only Sin," or "Strictly Dishonorable," or "The Greeks Had a Word for Them" are not suitable for children, conflicts arise that commonly lead to yielding against futile protest, or to denial, with resulting sullenness or rebellion, and ill-disguised pity that one should have to be dominated by an atmosphere so mid-Victorian.

Add to this the fact that it is no longer safe to let a young child, who is normally as outdoor an animal as a collie, play outdoors without constant surveillance. The automobile alone kills some 90 people

a day, one every 15 minutes, over 34,000 a year, about two-thirds as many as we lost in the World War. And there were 997,600 accidents. Even more sinister agencies haunt the rich, as we have good reason to know. Constant surveillance leads to a daily or bi-daily all-dressed-up outing with a guardian, about the nadir of wholesome entertainment for a normal child. Confinement in a yard, even if large and in a suburb, irks him as it did Rasselas in his beautiful but walled-in Paradise. He wants freedom to go out alone to seek chosen companions, the only normal social intercourse for a child. But the streets are no longer safe and mothers are apt to be hypercritical about his "chosen companions." Many of our suburbs, even, have made almost no provisions for playgrounds, or if they have the "trained recreationist" can easily take the normal spontaneity out of the fun of playing that under normal circumstances organizes itself unaided from within. The necessity for eternal vigilance outdoors, and for constant inhibitions and denials during the longer hours indoors, make for shattered nerves and broken discipline on the part of the mother and successful rebellion against authority and for domination on the part of the child. The bride's rosy dream of a big family often leads to a rude awakening. As a result our families have steadily dwindled in size until the one-child family, in which all behavior problems reach their acme, is no longer a rarity. The old-fashioned family, with many children normally spaced, was an independent social community in itself.

One of the deadliest of all the effects of this machine age in this connection is the mechanization of life itself. Man is by nature a free being who chafes and rebels under restraint. He may not have the slightest fondness for strong drink but let an outside authority impose an Eighteenth Amendment and a Volstead law on him and he forthwith seeks out a bootlegger and carries a hip flask. The complexity of life has made mechanization necessary and, though grudgingly, we adjust ourselves to it. We are getting used to red, amber and green lights in most of our activities and the end is not in sight. The child cannot as yet grasp the necessity for red and amber lights. Green is his natural color and he wants it on all the time. He protests against having his normal play interrupted to practice his music or go to a dancing school at a fixed hour; to having his neck and ears washed, his hair combed, even his nails attended to, having to be dressed up and kept clean to meet a possible social exigency, when all these manifestations of an adult sense of duty and propriety made necessary by the compactness of social contacts, differ so fundamentally from his own normal ideas of the optimum conduct of life. Even having to play at a fixed hour a fixed game gets, and merits, a protest. And now he must even go to a doctor every so often, especially on

Saturdays, for a periodical health examination, when he seems to be so healthy and full of life. It is hard for him to adjust himself to queer restrictions of diet and to such silly things as rest periods that are not restful. Mechanization of activities normally leads to conflicts; a child that under such conditions does not present conflicts is a dud—he will never make a noise in the world.

I am constantly reminded of my own childhood on a farm. There were five of us so spaced that we easily tolerated one another. Our pleasures were the simplest, the high spots so rare that they were keenly appreciated. A trip to town was an event. The annual circus was something to look forward to for months and to live over for months more. The anticipation that the proverb says exceeds the realization was directed to the marvelous posters of lions and tigers and "blood sweating behemoths" and lovely spangled ladies all jumbled together in gorgeous colors. Once we made a voyage to Chicago, a hundred miles away, an unforgettable event. Our social life consisted in having company, or going visiting, on Sundays, occasionally. School was great fun, and the annual literary entertainment at the school has never been equalled by anything since. Christmas was the great event of the year and it didn't do us any apparent harm to believe in Santa Claus and we had no damaging psychologic reaction when the deception was finally discovered or revealed to us. Our playthings were largely of our own make. It was fun to get in the cows in the evening and to feed the pigs. Our sunsets were gorgeous and plainly visible. We had no "bull frogs," with due apologies to our Senator from Mississippi, but we were keen observers of "the love life" of the domestic animals. The "hired man" supplied the rest and I am not sure that it did us any harm. We were no problem, there were few inhibitions and as a consequence no serious rebellion and no serious conflicts, at least not above the surface. We obeyed naturally and implicitly, as a rule, and were rarely punished. We ate what was set before us—it was expected and was done. We read a great deal, carefully and appreciatively and repeatedly, because we did not have the deadening multiplicity of books of the present time, when children go to the library and bring home an armful of trash for the week-end, while Dickens and George Eliot and Thackeray and Shakespeare gather dust undisturbed on the shelves at home.

A transition such as I have depicted, that has taken place within a few decades and is probably still gaining momentum, inevitably presents a problem of which our individual psychiatric problems are legitimate offspring. It is no simple problem. It exists and must be met on its own terms. The simple life has gone and will probably never return. I am not lauding "the good old days," nor deploring the present. "Fifty years of Europe" is doubtless "better than a

cycle of Cathay." It does, however, seem to me to be important to keep in mind in facing the problem before us that it is new and enormously big and that it will require "wary walking" if we are not going to do more harm than good by our method of approach. It is too much to hope, even less to expect, that there will at all times be the wisest procedure and co-operation among the manifold and multiplex agencies that are concerned in the solution of the problem. Its very nature and complexity preclude such a possibility. It can, furthermore, no more be solved alone by what may seem to be logical procedures based on scientific data obtained by the laboratory method, than one can remove the economic depression by analysis, or by legislation or exhortation. We are not dealing with fixed mechanical things that follow known laws, we are dealing with psychology, and even more with that intangible and unpredictable thing, mass psychology. Even though one may have no ready solution to offer, one can at least record certain observations, point out certain dangers that seem inevitable in the light of past experience with analogous situations and make some suggestions as to what would seem a proper approach to that solution.

In approaching a problem of this kind there are two self-evident desiderata: We must acquire useful knowledge as to the fundamentals, and we must apply that knowledge in practice. In acquiring useful knowledge there are again two natural methods of approach—from within and from without. The two types of knowledge so gained are not identical nor coextensive one with the other. To be useful, I might even say, to prevent disaster, information obtained from each source must be complemental to the other. The pediatrician and the family physician only can approach the problem from within. Their knowledge of the situation is unique and to my mind indispensable. They alone have a first-hand knowledge of the normal habitat of the child. They alone are familiar, through mass experience with the psychology of the home in general, and with the particular home in which a problem arises. They see the latter in its incipiency, they know the atmosphere that surrounds it, they are in the unique position of preventing it by sensing the probability of its occurrence if not forestalled by timely advice. They are on a friendly, sympathetic, confidential basis with the whole situation. The child is a friend and a patient, not a case. They, alone, likewise, are practically familiar with the reaction of lay psychology to propaganda from without that cannot be usefully digested and assimilated, and therefore often leads to serious trouble. Unfortunately this knowledge is assumed as a matter of course, is rather intangible and unclassifiable and therefore does not lend itself readily to transmission to others. The pediatrician and the family physician, too, have not become as conscious and mindful

of it as an essential factor in their dealing with the child as would seem desirable.

The other method of acquiring useful knowledge is from without—by those especially interested in psychology, psychiatry, child guidance, mental hygiene and behavior. It is the laboratory method of approach, carried out in the psychiatric clinic and practice, in the child guidance clinic, and in the nursery, kindergarten, pre-school and school. It leads to a classified knowledge of normal and abnormal behavior of the child under various conditions. Such knowledge is of great interest and value, per se, as is all knowledge. To be practically useful, however, it must be restrained, transformed, and mellowed in its practical application if it is not to do more harm than good when it encounters what I have called "pediatric psychology." Studying newborn babies in the nursery and determining that they have only three primary instincts does not necessarily fit a man to give sane practical advice to parents, or to try to save the "institution of parenthood" from its complete failure by suggesting that "it would be better if there were no more babies for twenty years or only a few for experimental purposes." The child guider who sees "sex tension" in "enuresis, unprovoked tantrums, night terrors, cruelty to other children and to animals, wanting to be with parents especially at night," is not, *ipso facto*, a safe purveyor of advice to mothers. I think it might be stated more forcibly. But even the knowledge so obtained that is unquestioned both as to its soundness and as to its ultimate practical usefulness cannot be foisted wholesale upon the laity without danger of adding fuel to the flames instead of quenching them. Especially is this true when the spread of such information bursts beyond legitimate confines and assumes the proportions of a propaganda in which half-baked enthusiasts, both among the laity and among those inadequately trained, take upon themselves the responsibility and the duty of carrying the torch of enlightenment into the home. It does not add to the safety and usefulness of such information to have it broadcast while it is still in a transitional stage of confusion and is obscured in strange verbiage, concepts and practice, that bewilder not only the laity but also the practicing physician who tries to be well informed and useful in all that pertains to his contact with the family in the home.

The pediatrician who looks out upon the whole subject from the vantage point of the home readily sees a striking and instructive analogy to other situations through which he has passed and which he has outlived. Stressing this point will help to save me from what might otherwise seem an assumption of arrogance when I attempt to speak to you on the subject before us. The development of our knowledge of infant feeding and of its practical application in the home

perhaps best lends itself as an illustration. It, too, was a new and a big problem that came upon us rather suddenly, largely, too, from necessity. There was the same division, as in the present situation, into those who constituted the ultra-scientific group, who studied the problem in the laboratory, or, at least, by the laboratory method; and on the other hand, the pediatrician and the general practitioner, who tried to make out what it was all about in the attempt to put it in practice. In some instances the two groups merged; in others they pulled farther apart. The whole thing became increasingly more complicated. Herod was outheroded in offering ever new and more complicated solutions of what and how to feed a baby. It became a problem of mathematics, in which we went at least as high as algebra—some one has said that we once touched logarithms. I cannot vouch for the latter but I do know that for some years, about twenty-five years ago, I carried in the back of my pocket notebook a series of algebraic equations by which I calculated the amount of milk, cream, whey, sugar and water necessary to give a baby the percentages of fat, protein and carbohydrates that I assumed were appropriate for his present age and state of digestion. We even split the protein and debated between one and one-half and one and two-thirds per cent of fat in a given formula. As the thing went on some of our textbooks and magazine articles on infant feeding looked like a treatise on mathematics or astronomy. On top of all this there was imported and widely adopted a thing called the energy quotient, which involved a second mathematical calculation to determine how many calories per kilogram or pound of weight a baby of a given age and weight could safely tolerate. Jacobi, who was one of the few among authorities who did not follow these mathematical vagaries, summed up the situation in a characteristically incisive manner by saying that we "fed babies by mathematics instead of brains." There was the same spread of information to the laity as in the present instance from many and various sources, and the same eager acceptance of anything that had a "scientific" background and smacked of the laboratory. The effect of this on the laity I shall take up presently.

To the practicing physician there was endless confusion and, inevitably, continuous change in procedure as new discoveries were announced. A surgeon once asked me: "What are you feeding babies *today?*" and I could not logically resent the implication. Another time a young practitioner who was eager to be up to date came from a distance to spend a few weeks in our clinic to learn how to feed babies by the so-called "Percentage Method." He had never been able to master it while a student. He told our dietitian his plans and expected a sympathetic welcome. She was a bit brusque as she told him: "Why, we aren't feeding percentages any more." He was stunned for a

moment, then let out a good round justifiable oath, walked out, and never returned. The reaction to the complicated problem of this kind was, and probably always will be the same by those physicians directly concerned. The pediatrician whose whole interest was in the child, buckled down and tried to master the intricacies of infant feeding. Some of the general practitioners did the same. The rest of them, nearly all of them, and therein lies the danger of all such developments during the complicated transition stage, chucked the whole thing and followed the safer course of prescribing one infant food or another that gave full directions to the mother on the wrapper that came with it. As usually happens, a period of increasing complexity was gradually followed by a period of increasing simplicity. The pediatrician is today actually embarrassed at times in deciding which one of so many simple ways of feeding a baby to choose in a given case. In the wake of this development innumerable psychiatric problems have arisen that will take years to live down. The pediatrician has played into the hands of the psychiatrist. It is not unreasonable to speculate as to what the psychiatrist will do in an analogous but far more delicate situation, in which not the body but the mind itself is involved.

The second desideratum that I have indicated is that of applying our knowledge of psychology and psychiatry in practice. This naturally involves the pediatrician and the family physician on the one hand and the psychiatrist and his auxiliaries on the other. Ideally the matter seems very simple and I feel confident that the ideal will become a reality in time. The pediatrician, and I will hereafter include the general practitioner in that term for the sake of brevity, is a general practitioner to the young. He is a unique kind of a specialist. He has expert special knowledge on most phases of child care that no one else has, or can have. In other matters he is only the first line of defense. This implies an adequately useful knowledge of all things that pertain to the care of children so that he will know what he himself can handle advantageously on the one hand, and what he ought to refer to a specialist in another line on the other hand. Where he will draw the line must be left to his experience and to his conscience. I see no reason whatever why the pediatrician who is on the ground and knows the child and his family should not try to meet a psychiatric situation as it arises, or even better, forestall it before it arises. I see also no reason why he should not, after due deliberation and possibly a trial of his own, refer the serious case to a psychiatrist, just as he would a brain tumor to a neural surgeon, or an appendicitis to a general surgeon. I am convinced that in our present stage of development it is well to have a buffer between the mother and the psychiatrist. In our clinic at The Children's Memorial Hospital every

child is referred first to a pediatrician. If after careful examination and due deliberation he decides that the child should have psychiatric care he refers it to the psychiatric clinic, sometimes for consultation, usually for full care in that clinic. In private practice he naturally pursues a similar course. I do not believe that psychiatry, or psychiatrists, alone, are any safer, as yet, with a child than is any other specialty or specialist. As an illustration of the importance of cooperation and of danger without it, I might cite the following: We had a young girl at the hospital with a coarctation of the aorta, with a resulting blood pressure of over 200 above the point of narrowing. The school nurse, who is the first line specialist in tonsils, wanted the child's tonsils removed. We emphatically refused to do this because the child had had several cerebral hemorrhages due to the high blood pressure. The nurse took her to another specialist, an otolaryngologist this time, who removed the tonsils. Fortunately the child did not die. Analogous occurrences are just as apt to arise in the psychiatric field. A little boy of ten years came to our pediatric clinic with a diagnosis of chorea of some weeks' standing. He still had choreic movements and the diagnosis was confirmed. Several years before he had been kidnapped by some boys and held for several days. On another occasion he had been beaten up by some colored boys. He was timid, fidgety and unsocial. For this he was referred to the psychiatric clinic. He came back with a diagnosis of "Apprehension," and his mother had been advised to send him away to some distant relatives so that he might start all over again in a new environment on an equal footing with new playmates. Such advice could hardly be considered safe by a pediatrician, who knows that chorea needs rest and that it presents an incidence of over 50 per cent of cardiac involvement, which at that age has a mortality of at least 25 per cent within a few years of onset. The chorea demanded attention, the problem of some years' standing could easily wait. These illustrations are on a purely physical or borderline plane in which the pediatrician's authority is unquestioned. But even in purely psychiatric problems there is an advantage in a preliminary appraisal by a pediatrician who has a first-hand, inside knowledge of the whole environment in which they have arisen, provided, however, that he is alert to the situation and is reasonably able to meet it.

To what extent is the pediatrician prepared to assume this initial responsibility? I would say nearly, but not quite, as fully as in other fields of medicine. I think he has a little more of an awareness of the situation than he is credited with having. Assuming, however, that he has not, what is the course to pursue? To my mind there are clearly two things: he must be made psychiatry conscious, psychiatry minded, he must be led to think of the child as a whole with a mind inseparable

from his body, and that psychiatric problems are medical problems as fully as is measles, or pneumonia; second, he must acquire a deeper knowledge than he now has of the fundamentals of child psychology and psychiatry. The former of these two will come inevitably from its own innate momentum. It is in the air. "Necessity is the mother of invention." If the psychiatrist does not make the whole thing look too big he will tackle it to a useful degree. If on the other hand he gets the impression that the solution of a psychiatric problem necessarily requires a complicated machinery of procedure involving a psychiatrist, a psychiatric worker, and a psychologist; that the cost may amount to $500 per patient as in one guidance clinic; that it is necessary to ferret out the sex life of the ascendants for two generations to find out why a child lies, or steals, or runs away from school, or is apprehensive, then he will be slow to fall in line. I am afraid that if he ever tries to balance an "Ego-Libido Equation" he will be found wanting, just as he was in the days when he tried to feed babies by higher mathematics.

The need for a deeper knowledge of child psychology and psychiatry can, and will be met in several ways. In a few years no reputable medical school will be without a practical course in these subjects. Time, too, will work out the problem of whether the teacher will be a psychiatrist, or (and) a pediatrician, or perhaps better still that logical product that may loom big in the future, the pediatrician who specializes in psychiatry. Once awakened to the necessity for such information and having acquired an interest in it, he will seek further help through reading and attending special clinics. There is already a tendency among internes and residents as they leave the hospital after a pediatric interneship to take special work for a time in a psychiatric clinic. Some of these will ultimately specialize in psychiatry for which the background of their pediatric experience will make a foundation second to none other.

I cannot help but think that during the formative period of this psychiatric activity it would be well if information on this subject would be directed only to physicians and to those especially interested, and not to the laity except in the most simple and elementary form, carefully avoiding all matter of controversy. The physician would then be a sort of middleman here, as he is in all medical matters. No one in his right mind ever told *mothers* in a book what to feed their babies. That was an individual matter. On a former occasion I ventured to say: (1) "In actual practice the young mother with a nutritionally untutored mind who frankly states that she knows nothing about babies and leaves the instruction to me is a treasure; the mother who has perhaps specialized in dietetics while in college and who approaches the subject with a McCollum in one hand and a

Gesell in the other is sometimes more of a problem than is her baby." *Verbum sapientibus satis* is a happy combination of words, but it has never yet stemmed the tide in a situation such as now confronts us.

This brings us to what seems to me the most important aspect of the whole matter—the inevitable lay reaction to new and widely applicable advances in medicine in which the laity are interested and in which they can participate. In the present instance our interest centers in the mother and her child—the father has become rather increasingly negligible in this respect in our domestic evolution. It is the mother who carries the burden of child rearing and she takes her job seriously. She wants him as nearly perfect in every respect as scientific puericulture can make him. She loves science, and she likes it raw. She went dutifully and characteristically at the job of seeing after her child's physical welfare with the aid of her pediatrician and many outside agencies. In one way they did the job well, in another they made a mess of it. She is now becoming psychology and psychiatry minded, largely, I am inclined to think, because of her experience in the realm of nutrition. I can perhaps best illustrate what I mean by citing one of many similar instances. A very earnest and intelligent mother has three children, 20, 18 and 3 years of age. She never had any serious trouble of any kind with the two older children. There was never any behavior problem. They are children of whom she can well be proud. In medical matters that came up when they were babies, and later, she consulted her family physician only as seemed necessary. The youngest child had hardly had its cord tied before she was told that she must have a pediatrician. Characteristically dutiful and progressive she had an excellent pediatrician right away. She moved to another suburb after a time and had another equally good pediatrician, whom she saw periodically. When the baby was about 11 months old she came under my care. She was pathetically thin and a problem of the first water. I could make out no organic trouble. She refused to eat anything and everything unless coaxed or forced to do so—chiefly the latter. She was hopelessly spoiled. Her mother from a rather placid individual has become a wreck, whose life centers in that child. She knows what she ought to do but she can no longer bring herself to do it. She presents a greater problem than her child. Part of the blame no doubt rests on the fact that the child was a late arrival, a situation usually even worse than that of the one-child family. The fault was not with the pediatricians *per se*. It was with pediatrics itself, if in that term we may include all the various forces that were directed toward making a perfect physical specimen of an individual that had a mind as well as a body. I think it will be instructive, in the present connection, to elaborate upon this point. In doing so I shall present, once more, a situation that seems to me to

offer so many points of similarity to that now under discussion that one is again justified in reasoning by analogy.

It is a matter of common knowledge among pediatricians that somewhere around 50 per cent of children seen in private practice do not eat well. In a scientific investigation made among educated people in a university neighborhood the incidence of anorexia was stated to be 81 per cent. A pediatric colleague with a large office practice in a prosperous suburb estimated it at 85 per cent in his practice. A very prominent pediatrician has said that he paid for his house with anorexia. I have discussed elsewhere in detail the pathogenesis of this unique and amazing biologic phenomenon, the young of any animal refusing to eat, and will give merely an essential outline in this connection. In doing so I shall quote freely, directly or indirectly, what I have said on a former occasion:[1, 2, 3] "The evolution of scientific artificial feeding of infants was a long, devious and complicated process. A chaos of ever increasing complexity naturally resulted, that has only recently been replaced by a chaos of simplicity. Then as now, babies were fed with about equal success by any one of a number of methods with which the individual practitioner familiarized himself. In that earlier period it seemed necessary to observe meticulously the amount of food, the intervals between feedings, and the composition of the formula. Percentages and, later, calories were figured so much that some of us no longer like to run across either of these words, and try to keep them dark. There was something awesome, something of reverence about the word formula, from which we have not yet fully recovered. Its authority was accepted as an article of faith and its preparation and administration were a sort of household ritual. The present 'mixture' demands no such obeisance; it is only one of a lot."

Now, as is well known, a normal gain in weight is one of the essential attributes of growth in childhood and is the best, single, comparative, objective measure of normal physical development that can be expressed in figures. Always duly appreciated as such, at least in infancy, it became a sort of fetish when the campaign directed toward examining, weighing and measuring all children came as an aftermath of the World War. As a natural corollary came the height and weight charts. The scale and the measuring rod became the sole arbiters of nutrition and the height and weight tables became as fixed guides as if they had been handed down from Mount Sinai. The natural effect on the mother when confronted by a standard was to proceed to standardize her child, to make him weigh what he should for his height according to the tables. This naturally consisted in making him eat more if he weighed less than the tables called for; less, but rarely, if he weighed more. She set about characteristically

to do her scientific maternal duty by her child, and struggled heroically, and futilely, as every practicing pediatrician knows, to make him eat the proper amount. Advice, admonition and exhortation poured in from all sides, lay, medical and intermediate. All avenues of escape were shut off when the school nurse entered the arena as the unflagging champion of standardization and the sworn nemesis of the tonsil. And then came vitamins, and how! No intelligent physician, least of all a pediatrician, can doubt the superlative value of all these things under ideal control. Unfortunately in all new therapeutic discoveries and movements in medicine that permit of popularization and commercialization through lay, medical or intermediate agencies, such control comes only with time and with its own innate tendency to rectification. A glance through nearly any newspaper shows that such "ideal control" has not yet arrived.

Logical as it seemed to check up on all children by weighing and measuring them periodically, and to apply in practice all this newer knowledge of nutrition to the feeding of the child, and fruitful of results as it has been in many ways, it failed signally in one respect—it failed to take biologic cognizance of fundamental psychologic factors that are innate in all human beings and most keenly so in the irresponsible, spontaneous and as yet poorly inhibited and, so, shameless period of early childhood. For the same reason that his father now carries a hip flask the child rebelled against a sytem that allowed him no choice as to time, place, kind, amount or manner of taking his bottle and his later foods, and which did not consider whether he was hungry or thirsty or indisposed at the time. When his mother or nurse coaxed and finally forced him to eat against his will in order to bring him up to an externally predetermined standard, as is done in the majority of homes, he either refused to eat point-blank, or only under protest; or else he vomited in self-defense or from necessity, or dawdled over his meals for hours as a further protest against an arbitrarily imposed authority. The psychology of such anorexia is quite apparently a combination of a rather normal negativism; a desire for the spotlight, or for sympathy, or for domination; a conditional reflex; and I feel sure a dash of childish atavistic cruelty that finds pleasure in tormenting an enemy, in this instance his mother or nurse. That the etiology of this condition is purely psychologic becomes evident when it is found that such anorexia occurs only in the home, and is cured rapidly and almost without fail when the child is sent to an orphan asylum or to a hospital ward with other children of like age, or to a summer camp, or a boarding school, with no essential change in food, but with a fully absent mother or former nurse.

The nutritional results of such rebellion against forced feeding are still obvious on all sides, although there are encouraging signs of im-

provement. That is not our main concern at the present time. The child who will not eat is, *ipso facto,* a behavior problem, numerically the greatest of all, and as a factor in the genesis of further maladjustment probably second to none. One cannot fruitlessly nag or force a child to eat with such results as I have indicated without meeting and admitting failure and without losing that wholesome spontaneous discipline that alone leads to a normal behavior reaction. Now if a propaganda directed toward a matter so simple, so concrete, and so tangibly physical, can produce such a volume of abnormal behavior, or maladjustment, may one not expect an even greater reaction if to what has gone before there is added the profusion and confusion of psychologic and psychiatric and child guidance literature and activity that is being poured out in ever increasing amounts from all kinds of sources? In the one situation the mother tried to standardize her child physically, with such results as we have seen; she is now being confronted by the far more delicate and intangible problem of standardizing him behaviorly. In both situations the initial responsibility lies with the mother of deciding whether she needs or wants help in keeping her child normal, on the one hand, or getting him back to normal if he has deviated from it, on the other hand. In the nutritional problem the diagnosis was very simple. She had a baby, or an older child, she wanted to keep him well, she pursued the conventional course of consulting her physician periodically for examination and advice. If he did not seem normal it was evident and she again called in her physician. If things did not go well it was again evident and she took him to a pediatrician, or to another pediatrician, as the case might be. The prevention and the cure were relatively simple in nearly every instance. The diagnosis of a behavior problem is obviously not so simple. How can a mother tell when her child's behavior has risen sufficiently above the threshold of normal to constitute a problem that needs intervention? It hardly seems feasible to consult a psychiatrist periodically as she did a pediatrician, although one psychiatric group has maintained that one out of every three children should have psychiatric care. God help the race! if it is true. The pediatrician has rather lain down on the job of combining the two as he should in the natural order of things. Besides, the mother has been accustomed to thinking of the pediatrician as one who attends to physical things in childhood. She knows that there is a great child study, child guidance, and mental hygiene movement on to help her keep, or make, her child normally adjusted in, and to, a rather complicated world. It is in the air. It sounds reasonable and logical. Science is coming to the rescue. Things have not been going as smoothly as they might, that is certain. She follows that lead and begins to read up on it; if she has time to read at all she can't escape

it; it is all around her in books, in the special columns of the newspapers, sometimes several in one paper, in the bulletins from the Health Department. If she turns on the radio and is regaled by beautiful music she may soon hear a discourse on "Mental Health and How to Maintain It," followed by a chant that extols the virtues of a special brand of breakfast food. She naturally begins to scrutinize and analyze and diagnose her child's behavior more critically. She attempts scientific orientation in what before seemed only an inevitable domestic problem. She begins to see many things that she did not see before, and many things that do not exist. She is in a somewhat similar position to the sophomore medical student who finds that he has many symptoms in common with the diseases that he studies for the first time. She used to think that when her baby sucked his thumb it was either cunning or just a bad habit that needed attention, depending upon her individual reaction. She is rather startled to find out that it is really an expression of his infantile libido. But by this time she has found out that suppression of the libido is a sort of psychiatric meal ticket. What to do? She goes further and learns things even more disquieting. She has always thought that her boy was a bit trying and too much of a "mother's boy" but she never suspected that he had a complex with a name that harks back to the darkest episodes of the Greek drama. Some of her discoveries are less distressing, but no less important. She finds that he is a bit aggressive and self-centered in his interests, and the question arises of whether he has the proper cronologic balance between the egocentric and the social in his make-up. Or more often if he is somewhat timid and shy, and does not yet assert himself, he has that most banal of all complexes, an inferiority complex. No combination of two simple words has ever led to more varied interpretation and to more erudite satisfaction in popular usage.

By this time the mother is a little bewildered and she wonders how other mothers are meeting their problems. She joins a child study club, in which she hears much about other children and probably always comes away with at least one conviction, that the only perfect child is always in some one else's family. If there was some bridge and some tea with it, then, at least, it was a social success. To get real help for her problems she must look higher to something more authoritative. She joins a Society for Child Study and Parent Education. What could be more aggressively comprehensive than that? That ought to fill the bill. She goes to a meeting and listens dutifully to a program such as the following, that I will give in full as actually taken from the program: How Can Ethical Attitudes be Developed? Child Training for International Intelligence, Training for Racial Bigotry, The Effect of Motion Pictures on the Social Attitudes of Children, De-

veloping Vocational Attitudes, Parental Influence in Creating Religious Attitudes in Children, Training for Citizenship, Attitudes on International Relations, The Conflict Between Scholarizing and Socializing the Student. It would be interesting to read the thoughts of an intelligent, common-sense mother on her way home from such a meeting, to take up again the humdrum burden of the conflicts, annoyances, and irritations of the home, in which her problem had its origin and center. She may at least be forgiven for wondering whether it is really helpful, except to the speakers and the promoters, for her to be schooled into training for citizenship, or for International Intelligence and attitudes, or for racial bigotry, whatever that may mean, a young tyrant who has normally no civic virtues to begin with, either domestic or international, and who might not be worth bringing up if he had at that period of life. She may even have a similar reaction to at least an occasional Parent Teachers meeting, but would hardly dare to express her doubts. Perhaps after the children have gone to bed she might pick up a paper and find one of those refreshingly simple, direct, and really helpful articles by a school-teacher by the name of Angelo Patri and feel encouraged. But that is so simple, so understandable, so "home folks" in its approach and wording that it evidently lacks the stamp of modern scientific authority. She must not falter in her effort to keep up with the times. A book on Behaviorism obtrudes itself. Behavior is just the thing she is interested in, and here she finds the apotheosis of the laboratory method of child study in the raw. It is a bit staggering to be told that all of the maternal attitudes and virtues that have been cherished throughout the ages are "hooey" and "boloney," even dangerous forces that must be replaced by cold scientific data and procedures if the race is not to go under. It may be even more disconcerting to read that it might be better not to bring children up in the home at all. Even to her untrained mind this may seem like a rather unique aloofness from a biologic principle that runs throughout the whole world of animal life except the very lowest. She may be a bit suspicious that she has run across an "enfant terrible" in the psychologico-psychiatric fold such as are found in all such large aggregations of workers in a new and progressive field of endeavor. She seeks an antidote in further reading on child psychology, guidance and psychiatry, and mental hygiene. Here again things do not seem perfectly clear. She finds it hard to orient concretely her own problem in the midst of what seems rather confused and controversial dogma from apparently equally high sources. She finds a peculiar new emphasis placed on the importance of sex in the matter of behavior expressed with a frankness that may at times seem as though it were hauled in by the heels. She may even wonder how she and all previous generations of men grew up to an

apparently safe normal in a world in which sex was soft pedaled, possibly even on sound biologic and esthetic grounds. She finds, too, a new verbiage that is hard to encompass and apply practically, about personality and patterns; complexes and reflexes; sex tension and libido, infantile and suppressed; egocentricity and maladjustment; attitudes, fears and needs; urges and drives; dreams; self-expression and finding oneself, and what not. By this time the child himself should easily be, or at least seem, a problem and the mother even more so. The time has come to go to a psychiatrist. If she finds the right person, or the right clinic she will probably find help, maybe not. It is a big problem to make over two people and change an environment as well. All diseases are not curable, but fortunately we outgrow more of them than we are apt to think we do. If she goes to an ultramodern, high-power clinic she will probably be deeply impressed, maybe not, by the complicated machinery of approach, the strange and ramified method of search that goes back to the grandparents and that makes the ordinary big "once over" now so current in medical practice look like a piker by comparison. She is apt to find herself the target of questions, as is also the child, that even the modern matron, even if she is young, may find embarrassing; questions that she either resents, outwardly or inwardly, but perhaps more commonly accepts as one of the sacrifices that must be laid on the altar of the great scientific investigation and uplift of child life. I have perhaps presented an extreme picture; it is not, however, a rarity. It is intended to serve as an illustration of a tendency that is inescapable, is now very evident on all sides, and threatens to grow apace. Perhaps the depression may help.

I have laid especial emphasis on the mother. The child's reaction is inseparably interwoven with that of his mother. The essential difference between a child and an adult must always be kept in mind, not abstractly but concretely and individually. The biologist, the psychologist, and the psychiatrist know this and do it; can we expect the same of the mother? The child is no more a miniature adult mentally than he is physicially. His mind is not only simple—it is undeveloped in the sense of being primitive. The biologic law that the ontogeny is a short recapitulation of the phylogeny has a counterpart, or a continuation, in the fact that in his psychic development the child crudely repeats the history of the race. His conduct may seem amazing and nerve-racking to his mother but it is normal for his age, must be so considered, and must be met on that plane. He has a verve and an energy and a rebellion against restraint that amounts to belligerancy. He is in ceaseless activity and almost tireless. He loves noise and bustle. It is useless to ask a mother whether her young child is normally active if she has only herself to go by. His desires and his emotions

are unbridled and he is born with no sense of shame, or of sympathy for others in exercising them. Life has a zest that is unique for this period. We come into the world as Wordsworth has so exquisitely expressed it "trailing clouds of glory," and "Heaven lies about us in our infancy." We can no longer feel the same as a child feels when we have all too soon reached the stage in which "there has passed a glory from the earth," and even the memory of that glory is blurred. We have scant patience with the things we ourselves were and did. Being cooped up in an apartment, or nearly anywhere else with restrictions on normal activity that I have indicated, inevitably leads to conflicts as the mother attempts with varying tempo to adjust the child to the necessary conventions and inhibitions of later life. Such conflicts are normal in any environment but modern life has made them acute as never before. The "don'ts" and the "I wills" clash and the latter win out as the mother is worn down and the child acquires an active immunity to discipline. The problem naturally follows. The following incident is a sort of epitome of the whole situation and bears repeating: (2) "I was trying to examine a child who was crying and fighting constantly. The mother started off bravely with all kinds of sympathetic measures and endearing terms, such as 'lover, darling, precious baby, sweetheart, won't you hold still for the nice doctor?' Then suddenly she cracked under the strain and shouted, 'For God's sake, Frankie, shut up!' "

Under such circumstances it is hard for a mother to appraise her child's behavior—to decide whether he is safely normal, or abnormal enough to require help. The more she looks into the matter the more, I feel sure, will she be stimulated to find something wrong that requires psychiatric care and that early. As illustrations I might cite the following incidents: A mother with inverted nipples called up her pediatrician and said, "My baby is only two days old and already he has a negativism; he won't nurse." Another mother and a friend took a young child to a child guidance clinic. The mother said she wanted him "psychoanalyzed." The friend interposed, "No, it wasn't the psychoanalysis you wanted, it was the inferiority complex, wasn't it?" The mother will naturally look for a yardstick with which to match her child's intelligence, behavior and aptitudes with an established assumed normal, as she did in the nutritional situation his weight and height with the tables of average weights and measures. It is such a simple thing to do to solve so weighty a problem. All she has to do is to find out what he can do and will do, perhaps under somewhat unnatural conditions. This holds him up to a scale of age performance which records his mental age. If this is multiplied by 100 and divided by his real age we have his intelligence stated in figures. There is something intriguingly concrete about figures—it has even become

proverbial that "figures do not lie." This procedure, however, requires some one especially trained to carry it out. She can do it herself, especially in the period of infancy, by holding him up to Gesell. How things have changed is shown by the fact that many years ago Preyer wrote an exhaustive treatise on this subject, that appeared in English translation under the title "The Senses and the Will." In all that time it has been the standard authority in medical circles and has been quoted in our pediatric textbooks. It never got to the laity except by medical application. The intelligence quotient is a valuable and practically useful item if it is properly interpreted as a crude determination of a child's present mental status, just as a child's comparative weight is a crude measure of his present nutritional state. It is not a safe thing to give to the mother, or to the child, even less to the public. The contributions of Gesell are the most fascinating and instructive that have appeared since Preyer's time. They are readily accessible to the laity and therein lies a certain danger. No matter how much stress may be laid on the fact that there are fairly wide normal chronologic variations in development the mother is going to accept the average as the established standard with resulting elation or depression as her child rates ahead of, or behind, that standard. I know a very intelligent mother who worried all during her child's second year and half of the third because he used only a few words even at that late period. She held him up to Gesell and found that if a child was two and one-half years old and did not talk there was probably something seriously wrong with him. If idiots and imbeciles are included that is true. This child was neither. He was normally bright in every other way. In spite of my repeated assurances that every child who looked and acted bright and had no defect in hearing would talk even after two and one-half or three years, she nearly took him to a psychiatrist and a specialist in speech. I have often wondered how they would have gone at the thing. Now that he talks normally there is left only the memory of many unhappy months.

It is one of the common observations in pediatric practice that children do not follow standard chronologic patterns of advance in their mental and behavior development any more than they do in their physical development. In both instances there are spurts and retardations, both in general and in particular phases of developmental advance, that may be either innate or environmental in origin and that have little bearing on the final outcome. I think every pediatrician of ripe experience has observed too that there is a natural tendency for those who are somewhat aberrant in childhood, either physically or mentally and behaviorly, to straighten out as they get older, for one reason or another. It is surprising as one sees children grow into adult life how many that seemed rather hopeless in early life from a

behavior standpoint turn out to be all that could be desired later in life. In that there ought to be some comfort at the present time. One of the most faithful and devoted mothers that I have ever known told me once that when she was a young girl her mother used to think that "she would end up on the streets," as she put it. I used to go to school with a boy of about sixteen years who was the village "cut up" and all around bad boy. He was an adorable little cuss in one way and incorrigible in others. He was not considered a safe playmate by the good mothers of other boys. He ran away from school, got into scrapes of many kinds, and finally got drunk one night and slept in the village stockyards. The next day he ran away from home, rode the bumpers all over the West for several years, consorting with tramps, sometimes eating in restaurants and sneaking out when the waitress went back for an order, and never once writing home. In due time he settled down, went to college and medical school, got married and became an unusually staid and worthy practitioner and citizen, rather puritanical in his outlook on life. Both of these individuals presented rather major problems in behavior. I wonder if a psychiatrist could have done a better job than was done by Time itself, together with one of those unpredictable and determining changes in environmental forces that often come when least expected. I think there is a real possibility that they might both have fared less well under psychiatric care. It is not a wholly care-free procedure to take a child to a psychiatrist or a psychiatric clinic. It is not as bad as going to jail or to an insane asylum, but after all it is only a matter of degree in a way. Young offenders are not sent to jail—they go to a reform school. The insane are not sent to an insane asylum—if they can afford it they go to a Sanatorium for the Nervous. For the same good reason we see the same mollifying tendency in the "Child Guidance Clinic" as compared with the "Psychiatric Clinic." Be that as it may, there is a certain danger inherent in the procedure. In saying that I am not thinking of the psychiatrist or the child guider, any more, or just a little more, than I did of the pediatrician in the analogous situation to which I have already referred. I am thinking of what is going on at home, of what the lay reaction is to the procedure. The pediatrician was *particeps criminis* in producing the child that gloried in the distinction of being able to say, "I don't eat," with all that went with it. We had a little girl at our hospital not so long ago who told any one who came near her and seemed interested, "I'm a problem." She was, and she was doubtless more of a problem because she knew that she was a problem. Others may not express it in words but they sense it, as children will so readily, and they get the same kick out of it that the child does who will not eat and for the same reason. If this whole movement spreads apace as it seems to threaten to do and if every

one out of every three children is taken to a psychiatrist or a child guider, as has been suggested, then I am afraid this reaction, expressed or sensed, will occur often enough when mothers add to their baby doctor, and their family doctor, and their throat doctor, and their beauty doctor, a behavior doctor.

In any activity such as that in which we are now concerned there are always many and varied forces at work. There are many restrained, sober, safe men and women who are doing well the needed work in investigation, in clinics, and in private practice. There are sane, understandable, and safe books that are helpful to the laity, such as those of Thom, Anderson, Cameron, Angelo Patri, and doubtless others with which I am not so familiar. To those one can only wish Godspeed. On the other hand there are always a few unbridled enthusiasts, extremists, wild theorists, dreamers, dialecticians, synthesizers, sensationalists,whose feet are not always on the ground, and perhaps even occasionally one whose motives may not bear close scrutiny. Unfortunately these have an appeal especially to those who do not understand them, and are often most vocal in their efforts. There is also a current tendency in medicine to volume delivery. There is apparently also a tendency, that I am told is not unknown in trade in Mexico, of charging more wholesale than retail. To a somewhat old-fashioned clinician who feels that he can make a safe diagnosis in 90 per cent to 95 per cent of cases without laboratory assistance the modern so-called "big once-over" in medicine is a bit disquieting. The ramifications and all inclusiveness of the procedures of some of our psychiatric and child guidance clinics leave much the same impression. Even farther, in one of our large cities I am told there is a Society of Psychoanalysts, membership in which requires the candidate to be psychoanalyzed himself. Apparently a psychoanalyst is not a full, safe, real phychoanalyst until he has himself been psychoanalyzed. I am told that this process, fully accessible to the laity, of course, requires a year or more of almost daily one hour analyses at the current rate of $25 an hour. I am told that $3000 or $4000 is a moderate retainer, a rather intriguing word; that that amount is often doubled, and that business is good. There is a comfort in a situation like this if one can look at it from an historical point of view.

Another force that must be reckoned with most seriously is that of the layman himself, more often, herself, as a propagandist in the interpretation, diffusion, and practical application of all this new and confused knowledge of psychology and psychiatry. It has wide ramifications and in sheer volume exceeds all others. It is made up of many individuals and groups of individuals that vary in kind and method and motive and influence from individual to individual, and from group to group. They are commonly actuated by a sense of duty,

sometimes by a laudable desire for power and influence, sometimes by ambition in the professional or social scramble for preference. Unfortunately they necessarily have that "little knowledge" that Pope has immortalized as "a dangerous thing," and from the very nature of things they cannot "drink largely of the Pierian spring" that "sobers us again" when "shallow draughts intoxicate the brain." It includes the psychologist who becomes a clinician, the psychiatrist who has no medical background, the psychiatric worker who enters the field without medical supervision and restraint. It includes the young college graduate who has specialized along these lines, who knows little or nothing about the delicate mechanism of the family from personal contact, and who is still in that unmellowed transition period in which knowledge is assumed to be synonymous and coextensive with wisdom and experience in practical application. Youth is dynamic, full of assurance and enthusiasm. Life and its problems are clear cut and easy to meet and to solve. It includes the school nurse in a strategic position second to none. It permeates the activities of the woman's clubs, the child study clubs, the parent-teachers' societies, the societies for child study and parent education, the schools from the kindergarten and before, up through college, the professional recreationist, the lay writer and lecturer, the columnists, the radio broadcast, the health department bulletin, the afternoon tea and the bridge party. Some of this is probably helpful through calling attention to a situation that exists, some of it is safe and harmless, some of it is merely running around in a circle with a social background, not a little is pure dilettanteism, and some of it plainly pernicious. As an illustration of the latter I might cite a private school, a high-grade modernistic psychologized school, in which the pupils in one room were divided into those of normal, superior, and inferior intelligence, and their names were posted on the wall on that basis. A very bright but shy little fellow who had not yet become socialized, and I suppose had not yet "found" or "expressed" himself, whichever it might be, was found posted in the inferior class. Some of it is amusing. A young woman, I do not know her exact classification in the uplift, walked into a schoolroom, appraised the situation with an authoritative glance, and announced quite audibly, "I don't believe there is a normal child in the whole room." A cultured, unmarried woman of mature years once summed up her reaction to this phase of the whole subject by saying with a twinkle in her eye, "As a spinster I have one ambition in life: to write two books—one on the rearing of children and the other on the management of husbands."

I am fully aware that the sane, common-sense, psychiatrist does not welcome, much less encourage, this intrusion into a field that is in the making and that requires sober investigation and wary procedure if it

is to be safe and helpful. But it is there, it always is there in such movements. It grows until it becomes top-heavy and finally declines from its own inertia. That it is still growing in cultured soil is evident from the fact that the evening on which I gave my paper in Boston there appeared a short, to me at the time rather disquieting article in one of the newspapers, headed, "Massachusetts Leads All States in Psychiatry." It went on to say that the whole state was to be organized psychiatrically. Psychiatry was to be introduced into the elementary and high schools, was to be taught more extensively in colleges and to nurses, especially school nurses, was to be made accessible to all laymen, and finally was to be made practically available to teachers and clergymen in their work. If, as John Dewey used to tell us when I was a student, "the purpose of an institution is to do away with itself," then one may clearly pray for the success of psychiatry in Massachusetts.

A most encouraging promise of eventual improvement in the whole situation is the report on Psychology and Psychiatry in Pediatrics: The Problem, by a sub-committee of a Committee of the White House Conference. That this sub-committee, composed of a pediatrician as chairman, and seven psychologists, psychiatrists and child guiders was able to present a unified report is a matter of some significance. I think if all of us would read that report with an open mind it would help materially to clarify the present confusion. As a masterpiece of analysis and synthesis, of comprehensive yet incisive presentation of a complex subject, the report of the chairman, Bronson Crothers, will bear reading many times with profit both to the reader and to the situation under consideration. There is a temptation to quote from it freely and often. The following quotations seem peculiarly appropriate in the present connection—"The technique of propaganda and instruction is decidedly faulty and should be studied with prayerful eagerness." . . . "We trust that restraint, a peculiarly difficult attitude for the pioneer, will become a routine virtue as the science of psychiatry grows to maturity."

One thing more in conclusion. In this psychologic and psychiatric and mental hygiene movement we are all engaged in trying to meet and remedy a situation that already exists. There is something new and morbid about the situation itself. It smells of the machine and of exhaust instead of the woods and of new-mown hay. The song of birds has given way to the honk of the auto and the screech of the street car. Our children are being analyzed and classified and moulded and packed into a pattern that lacks the spontaneity and freedom that is the birthright of the child in "the playtime of life." It is idle to hope for any adequate prophylaxis, the only full solution of the problem. The simple life has gone the way of the Dodo, never to return. Per-

haps it is best so for us. Who knows? But for the child we must ever strive for that ideal of simplicity so far as it is environmentally possible. Anything that will help us to visualize concretely what a normal child is like in a normal free environment unrestrained by the conventions of a complicated world should help us to approach that ideal. It is for that reason that the experiment conducted by Dr. Clara Davis,[4] to which I have referred many times,[1, 2, 3] is to me an outstanding contribution to child life. It began as a simple experiment in nutrition, to see what a normal hitherto wholly breast-fed infant of eight months would eat and do if allowed, unaided and unhampered, to select its own food from a large assortment of raw and cooked, but unseasoned, uncombined and unsophisticated foods made up of such foodstuffs as we ordinarily associate with the older child or the adult. It has gone much farther. The experiment extended to 14 such babies and over a period of six or seven years. No psychologist has ever entered the place except as a visitor. No child guider or psychiatrist has ever been needed. No pediatrician has obfuscated the normality of things by introducing a meticulous regime. There was a normal exercise of gregariousness, not without the occasional physical encounter that arises from momentary conflicts of viewpoint or interest that characterizes the normal child and proves that he is normal. There was no indigestion—no anorexia except with sickness. A rickety baby got well by himself. There was little restraint—hence no serious rebellion, no problem. They were the finest group of children of that age that I have ever seen, physically and behaviorly. They were not bad, they were not too good, they were normal. All this was done in an old made-over house, in an ordinary street in a built-up section of a large city. I wish every psychologist, every psychiatrist, child guider and mental hygienist, and, even more, every pediatrician could have seen the whole thing and with an open and a plastic mind. It loses in the telling—it had to be seen to get the full effect. I think it would have influenced their whole attitude toward the child as it has mine. It seems to me of great interest in the present connection.

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CONGENITAL OCCLUSION OF THE DUODENUM AND SMALL INTESTINE; A CLINICAL CONSIDERATION WITH REPORT OF TWO SUCCESSFUL CASES

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IN A REVIEW of the literature on this subject a consideration of the salient factors is found in the order that is usual for most medical subjects. The occasional discovery at autopsy of congenital intestinal occlusion was first reported, and in speculating on the possible causes for this condition the early authors turned to embryology and pathology. Interest in the various possible causes and pathologic classifications, as evidenced by the space allotted to them, has surpassed that of the clinical handling of the patient before and at operation. Finally there comes a period in which the factors of diagnosis and treatment begin to have more space allotted to them. Even though the controversy over the cause or causes of occlusion still goes on, as there has been no suggestion that has been acceptable to all, progress as a whole has begun to appear, as has happened in so many other medical conditions in which the successful outcome of the case can be assured, without an actual knowledge of the underlying cause.

The successful outcome in a case of congenital intestinal occlusion is more dependent upon the possible causes and pathologic types than is the case in intestinal occlusion arising after birth. Because of the infrequent occurrence and acute nature of these anomalies they are usually met and dealt with unexpectedly, without regard for the possible causes and types to be encountered. An increase in the number of reported cases, and of an occasional successful one may increase the general interest in this subject.

OCCURRENCE

Congenital abnormalities in the form of an intestinal stenosis, an atresia and an aplasia, are relatively rare as was shown by Thermin in 1877 (Quoted by Bryan[1]). He found that in the examination of 150,000 children at a Foundling Hospital in Petrograd only 9 cases were recorded; only 2 were found in 110,000 autopsies in Vienna; and 2 in 41,000 in Copenhagen. The usual ratio of congenital intestinal occlusion is given by Farr and Brunkow[2] as about 1:20,000. St. George[3] reported 2 cases found in the large necropsy service at Bellevue Hospital in fourteen years. Webb and Wangensteen,[20] in a recent publication found mention of more than 500 recorded instances in the literature, and added 17 cases to the record. In a study of the literature of congenital duodenal stenosis and atresia by DeSanctis and Craig[7] the first report of a case of occlusion was accredited to Calder in 1733, published in the *Journal of Medical Essays*, Edinburgh, and the second to Daniel in 1765. Cordes,[8] in 1901, reported on 57 cases collected from the literature. Davis

and Poynter[9] collected 124 cases from the literature in 1922 which was 33 per cent of all congenital intestinal occlusion. Von Koos,[10] in 1920, reported that 30 per cent of gastrointestinal atresias were duodenal. Kaldor[22] reported that 250 cases of duodenal atresia could be found in the literature up to 1929. Congenital occlusion of the small intestine below the duodenojejunal juncture may occur at any point. Landau,[11] quoted by Farr and Brunkow,[2] places the jejunoileal junction first in frequency. Hirschsprung, quoted by Bryan,[1] from an analysis of 31 cases, gave 16 in the duodenum, 6 at the omphalomesenteric duct and 9 in positions between these two points. He also quoted Sprigg who stated that 28 per cent were at or about the duodenum, 38 per cent jejunoileal, and 8 per cent unclassified. Multiple occlusions have been found in many instances and most frequently in the small intestine. In a series of 328 cases Spriggs[12] stated that 20 per cent had multiple lesions. Davis and Poynter, quoted by Farr and Brunkow,[2] in a study of 392 cases estimated that 15 per cent showed multiple lesions.

ETIOLOGY

Many causes of occlusion of the lumen of the duodenum and small intestine at birth have been cited in the case reports. The extraneous causes that are not directly associated with defective development of the organ or adjacent organs have not been included in the later reports of cases under the title of congenital occlusion. In some instances the original cause that produced the deformity has been supposed to be due to pathologic conditions that had healed with no signs of specific pathology remaining. In view of the fact that many suggestions have been advanced as a possible cause for the occlusion, and that none of them have been acceptable to all as the underlying basic cause, a general familiarity with the possible causes is of assistance in the diagnosis and treatment.

The theory of defective development of the digestive tract has been receiving more consideration in the more recent case reports. Bryan,[1] and DeSanctis and Craig[7] quote Bland Sutton,[13] who as early as 1889 said: "Congenital obstruction and narrowing of the alimentary tract are always found in the situation of embryological events." Farr and Brunkow[2] say, "Of all the theories proposed, the developmental appears the most logical." Webb and Wangensteen[20] agree that no one factor adequately explains the cause in all instances but that the failure of a portion of the intestine to acquire a normal lumen during its developmental period would seem to be the most plausible.

Bryan[1] in a discussion of the etiology has arbitrarily divided the causes into (1) maternal and (2) fetal. Under maternal he quotes Ozenne as stating that he believes intestinal dystrophies to be rarely produced by syphilis. Although Schattelius found in one of his cases luetic hepatitis and perihepatitis. Holt[14] believed that congenital syphilis might be an etiologic factor. Under the fetal causes Bryan attributes the first rational theory to Tandler who noticed that the lumen of the intestine in the fetus is completely filled up by proliferating epithelium at one period in its development, and he concluded that the

congenital intestinal atresia resulted from stabilization of this embryonic atresia. Kreuter confirmed and developed the theory in a study of the embryo. He found the intestinal lumen open in a five-week embryo and that later it became filled with epithelium. In the embryo of seven or eight weeks, holes appeared and ultimately they united to form a continuous lumen, the cells did not disappear but were used in the growth of the intestine. This normal embryonic atresia may become permanent when all the surplus cells fail to be utilized.

Bryan also refers to Forssner's classification which includes: developmental defects, including snaring at the navel, fetal accidents, fetal disease, and in addition, other factors that had been brought out by different authors as developmental, peritonitis, postulcerative contraction, embolism or thrombosis of mesenteric vessels and proliferation of hepatic tissue in the region of Vater's papilla. But it was to that important intrauterine structure—Meckel's diverticulum—that Bryan wished to call particular attention, for the significance of the vitello-intestinal duct is evident.

Atresia from bands and adhesions have been reported by Kahn[15] and Landau.[16] Volvulus,[17] occlusion of the mesenteric vessels with sclerosis and degeneration of the mucosa,[13] enteritis, peritonitis and strangulation have been given as causes for atresia.

The study of the etiology in most instances heretofore reported has been made upon autopsy specimens. A determination of the cause of the occlusion before operation or at operation should be based upon a knowledge of the etiology, together with the clinical findings, roentgenologic studies, and the exploration of the abdominal contents. Even after a thorough physical examination, including a proctoscopic examination, an abdominal examination, an x-ray of the esophagus, stomach and intestines, and an abdominal exploration the actual cause of the occlusion may not be found before autopsy. In view of this fact one must be able to determine the probable cause and to know the associated lesions in order to carry out the surgical procedure that will give the patient the greatest chance for recovery and the normal maintenance of life. The examination of the abdominal contents of an infant during the first week of life and under local anesthesia is a very limited procedure without complete evisceration, which is not good surgical judgment in view of the attendant shock and difficulty in replacing the intestines. There are definite possible causes to be looked for at definite sites and more or less definite signs of those causes for which every surgeon should be equipped to look for and to properly act upon when found.

PATHOLOGY

The term occlusion has been used to denote the blocking of the lumen in the alimentary canal and in a broad sense to signify stenosis,

a partial block; atresia, a complete block with continuity of the gut maintained externally; and an aplasia a complete absence of lumen and in the external continuity of the viscus as well.

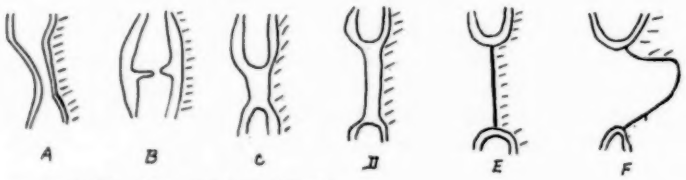
Stenosis may be caused by any one of the active embryologic defects of development as well as an active force from without that has no direct relationship to the development of the organ, viz., tumors or bands. Also, stenosis may be caused by defective development in or rotation of an adjacent organ, as in one case of the series here reported.

Atresia, on the other hand, would seem to be more closely related to defective development in the organ principally involved. It is conceivable that during intrauterine life there may have occurred ulceration or strangulation by volvulus or bands which might have resulted in a complete absence of the lumen. However, as Bryan[1] has said, Kuliga calls attention to the fact that surfaces covered with epithelium do not permanently unite, and that even if the epithelium should die, there is regeneration. The most logical cause for atresia would seem to be in a defect in the process, described by Tandler and confirmed by Kreuter, in which the epithelium which fills the lumen of the intestine in a five-week embryo is not utilized in the further development of the walls but remains in the lumen to cause an obstruction. This defect may possibly be added to the large number of other developmental defects which are accepted generally as more or less fixed conditions for which we have no suitable explanation for the active principle in the cause of the variation in the cell growth.

In an aplasia in which there is a gap in the continuity of the entire thickness of the organ both the theory of accidents before birth and that of a defect in the normal development might be plausible. An intra-abdominal accident might conceivably result in a complete severance of the organ with the resulting obliteration of a section and the healing over of the ends.

There may be a combination of stenosis and atresia in the same individual or multiple areas of both.

The classification of Forssner and Spriggs (quoted by Bryan[1] and Farr and Brunkow[2]) is as follows:



A. Simple narrowing, stenosis.
B. Perforated diaphragm, stenosis.
C. Complete diaphragm, atresia.
D. Short band, connecting the ends of bowel, atresia.
E. Thread-like band along free edge of mesentery, an atresia.
F. Gap in intestine and mesentery, an aplasia.

All the coats of the organ have been found in instances of stenosis in which pressure from without was the constricting cause. When a septa or diaphragm has been found there has been noted instances in which the projecting portion was made up of all the normal layers of the organ, and others in which the diaphragm consisted of epithelium and submucosal tissue. (M. R. Bonneau, quoted by Bryan.[1])

In an atresia the microscopic examination may reveal a complete absence of the lumen for a varying length and the intervening strand of fibrous or muscular layer may vary in length.

An aplasia presents a complete lack of continuity in the walls of the organ for a varying length with a gap in the mesentery (Cockaye[19]).

Above the obstructed area the lower end of the viscus will show edema, hypertrophy, dilatation, and—depending upon the length of life—a varying degree of ecchymosis and hemorrhage into the wall, together with ulceration of the mucous membrane and even perforation. The dilatation decreases from below upward and in the small intestine there may be dilatation immediately above the point of obstruction with moderate or even normal distention of the gut higher up in the tract.

DIAGNOSIS

Vomiting is the cardinal symptom in all forms of occlusion. After there is an established type of difficulty of this nature the x-ray is the most reliable diagnostic method available for occlusion above the small intestine.

All of the symptoms of duodenal occlusion are evident during the early weeks of an infant's life. The period at which the infant is suspected of having a serious deformity depends upon the degree of stenosis and the presence of an atresia. In atresia the vomiting will excite worry by the third or fourth day. At this time there will be vomiting of large amounts of either ordinary stomach content, or stomach content with bile depending upon the level of the atresia. Hunger and dehydration with steady loss in weight develop rapidly.

The abdominal distention varies so as to be of little diagnostic importance. The bowel movements may appear normal, but as a reliable diagnostic sign the movements cannot be depended upon. Abdominal peristalsis over the stomach is usually present before vomiting. The x-ray with a barium meal is conclusive, and further, by this means the extent of the stenosis or the level of the atresia can be determined.

The symptoms of intestinal occlusion also depend upon the extent and site of the deformity. There are a few essential differences between the symptoms and signs of duodenal and intestinal occlusion.

A gastrointestinal x-ray examination by means of bismuth by mouth should be done only in patients in which the obstruction is thought to be in the duodenum, after which the bismuth mixture can be evacuated by gastric lavage and the operation will not be interfered with. A

heavy mixture such as bismuth should not be introduced into the intestine above an obstruction in the small intestine because of the difficulty with which it is evacuated through an intestinal anastomosis or through any type of operative union. A barium or bismuth enema with a picture of the colon is permissible and is of assistance in ruling out the colon as the area of occlusion, after which the exact area in the small intestine of the occlusion can be surmised by the gaseous distention of the small intestine. It would be a distinct advantage to know the approximate site of occlusion in the small intestine before operation in deciding upon a choice of an operative procedure, however, the apparent amount of intestine above the first area of occlusion can be determined at the time of operation with sufficient accuracy to enable a choice to be made.

TREATMENT

The only hope of relief or cure is the employment of surgery in instances of atresia and aplasia. In the stenosis in which there are symptoms at birth of an occlusion, surgery will also have to be employed in most instances. Instances have been noted in which a stenosis was found in adult life that conformed to the congenital type and in which a competent nutritional state had been maintained without disturbing symptoms. An operation should be performed as soon as a diagnosis has been made and after the patient has been properly prepared. In this type of obstruction in which gangrene in the early stages is extremely uncommon an emergency operation without the proper preliminary administration of fluid, sodium chloride and glucose will not be necessary.

PREPARATION FOR OPERATION

When a chemical examination of the blood has been made for diagnostic purposes the level of the blood chlorides and sugar will be of assistance in determining the need for the replacement of these important substances. They are always depleted in obstruction; the need for fluid is also constant. Fluids are best administered by hypodermoclysis in the amounts needed to restore them to as near normal as possible. Also the chlorides and fluids may be replenished by small enemata when they are retained. Fluid up to 400 c.c. can be administered in 12 hours by hypodermoclysis with 3.6 gm. of sodium chloride and 12 gm. of glucose. For infants of seven pounds this preparation usually suffices to restore the blood elements to a point where the relative risk of surgery is greatly reduced. Blood transfusion is not as efficacious in the preparation for operation because of the small amount of fluid that can be safely administered. For patients with occlusion of the duodenum and intestine a preliminary gastric lavage should be done routinely just before the operation.

ANESTHESIA

There are advantages and disadvantages in every method, and for individual patients that method that is most applicable should be employed. Infants withstand ether well unless they are very much weakened from a neglected obstruction, and under ether anesthesia the abdominal contents can be very thoroughly explored.

Spinal anesthesia in obstruction is contraindicated because of the increased peristalsis that ensues. However, if one operates immediately after the spinal injection the increase in peristalsis will not be likely to have caused a perforation to occur. Infiltration and field block is the method of choice when applicable. It is followed by less shock and less dehydration than spinal or ether anesthesia. When a preoperative diagnosis can be definitely made, as by the x-ray, this type of anesthesia is sufficient, and it can be very effectively used.

OPERATION

The operative procedure in a duodenal occlusion must be dependent upon the site of the occlusion and its cause, when the latter can be determined. Gastroenterostomy is applicable for those instances in which the occlusion is in the first portion of the duodenum. A duodenoplasty should be employed for an occlusion in the second portion. A duodeno-jejunostomy should be employed for all obstruction in the third and fourth portions of the duodenum.

For occlusion in the small intestine the operation of choice, ileocolostomy (first performed by Dr. E. W. Peterson in 1921, and recommended by Bryan[1] in 1923) can be performed only when there is apparently sufficient intestine above the first occlusion to maintain normal nutrition. Demmer in 1927 reported ileocecostomy following resection. Enteroenterostomy must be performed when the obstruction is in the jejunum. This procedure is more difficult because of the small size of the intestine below the point of occlusion, and it is less desirable because of the frequency of multiple occlusion, the lower points of which may escape notice because of the lack of distention of the intestine between the points of occlusion.

Enterostomy for congenital occlusion has been reported on many occasions as being performed as an emergency measure but there has not been a successful outcome in a case of this type.

Recently Webb and Wangensteen[20] reported nine successful operative cases: The first by Foekens in 1911, an atresia of the lower intestine for which a side to side anastomosis was made; the second, by Ernst in 1916, a duodenal atresia for which a duodenojejunostomy was done; two cases referred to by Loitman of high atresia for which gastroenterostomy was used; one case by Richter of duodenal atresia for which he performed a gastroenterostomy; Weeks and Delprat in 1927 duodenal atresia with gastroenterostomy; H. C. Cameron mentioned a case of duodenal atresia successfully operated upon by Mr. Steward; Sweet and Robertson two successful cases of duodenal atresia; and Demmer a successful case of lower intestinal atresia following resection and ileocecostomy, making a total of nine successful cases of which two were intestinal and seven duodenal or duodenojejunal. In seven cases gastroenterostomy was employed alone in four, and in addition to a secondary duodenojejunostomy in another, duodenojejunostomy alone once, and one unclassified case by Mr. Steward. The addition of

a third successful case of intestinal atresia and one of duodenal atresia brings the total to eleven cases, three intestinal and eight duodenojejunal.

An analysis of the treatment heretofore employed in intestinal atresia leads one to suspect the cause for so few successful cases having been reported to be due to two factors: late diagnosis, and the use of a preliminary enterostomy alone. It is true that dilated and edematous intestine is not so likely to unite as it is when drained preliminary to the anastomosis, but the situation in this instance of an infant with an obstruction in the ileum in which infection from contamination is not so likely to be a factor would seem to justify the employment of both stages of the operation at once, viz., some type of anastomosis in one stage. The type of anastomosis will depend upon the location of the obstruction. In the lower ileum an ileocolostomy can be done with ease compared to an enteroenterostomy, either end to end or side to side, because of the small caliber of the small intestine below the site of obstruction. Webb and Wangensteen[20] employed a syringe and needle to inflate the lower segment held between rubber sheathed clamps; Clogg[22] suggested that the collapsed intestine should be inflated by air or water, and Douglass calls attention to the advisability of using some means of dilatation of the distal segment. However, when this dilatation is done by means of air injected between two clamps or after the loops have been withdrawn from the abdominal cavity neither method will adequately determine whether or not there are other areas of atresia or stenosis below the first sufficient to cause obstruction at a lower level. For this reason and because of the greater technical ease an ileocolostomy as performed in Case No. 1, and as recommended by Bryan after a study of his case and a very thorough discussion of the subject in general, would seem to be the most suitable procedure when it is also accompanied by an enterostomy. For obstruction in the jejunum a side to side anastomosis would seem to be the procedure of choice as a jejunocolostomy would not be likely to be adequate for maintaining nutrition. Distention of the lower segment throughout with air or saline by injection would prevent overlooking an atresia lower down. Webb and Wangensteen[20] report a case by Birgfeld in which a side to side anastomosis was done for an atresia in the upper ileum and in which an enterostomy was added, but due to continued vomiting after the closure of the fistula a second operation was necessary at four weeks of age following which the patient died.

A review of the reports of successful cases of duodenal and duodenojejunal occlusion would seem to indicate the use of gastroenterostomy to be preferable. However, after the experience as reported in Case No. 2, and also that of Sweet and Robertson[23] in which following a gastroenterostomy a duodenojejunostomy was necessary, the operation of duodenojejunostomy or a duodenoplasty would seem to be the opera-

tion most likely to meet the immediate need of restoration of function, together with the prevention of later obstruction from additional complications that may be present or that may arise later. In Case 2 the lack of vomiting was the sole cause for no interference having been thought necessary and the hypertrophic pyloric stenosis that occurred after operation was not suspected until revealed at autopsy. This was due to the gastroenterostomy acting successfully in emptying the stomach while the cause of death was primarily the laking in the duodenum of the bile and pancreatic juices held above and prevented from regurgitating into the stomach by the hypertrophic stenosis, and below by the congenital stenosis. Had a duodenojejunostomy been done in the first place the vomiting that would have occurred later or after three weeks would have demanded a second operation at which time a Rhamstedt operation should have been successful. Hindsight is better than foresight, and it is by hindsight that the cases of the future may benefit.

In placing the enterostomy in Case 1 the tube was sewn into an opening in the ileum approximately 1 inch above the anastomosis and the purse string stitch used to anchor the anastomosis and the enterostomy opening to the abdominal wall just beneath the line of the incision. In addition the lower abdominal region was drained with a rubber tissue drain placed in the lower angle of the incision and down between the ileum and colon below the anastomosis.

CASE 1.—INTESTINAL.—R. B., aged 4 days, male, birth weight, 7 pounds 9 ounces. Admitted 8/12/30. Weight 7 pounds 3 ounces.

Complaint: No bowel movement since birth, and fecal vomiting for 12 hours prior to admission.

Abdominal Examination: Soft, moderate distention, loops of distended intestine visible, no peristalsis visible. Return from enema negative except for a few shreds of mucus.

X-ray by Barium Enema: (Fig. 1.) Probable intestinal stenosis in the sigmoid area. The barium mixture failed to extend beyond the sigmoid except for a very small amount seen in the hepatic flexure. The colon appeared distended and constricted in the sigmoid region.

Preoperative Diagnosis: Congenital intestinal stenosis of colon.

Anesthesia: Local infiltration with 1 per cent novocain.

Operation: Left lower split rectus incision. Ileocolostomy, between lower ileum and descending colon. Ileostomy with tube above the anastomosis.

Findings: Intestinal atresia in lower ileum with continuity of ileum from this point to the cecum in a cord-like structure which appeared to have no lumen. It was uniform from the point of obstruction to the ileocecal junction. Above the point of obstruction the ileum was distended to approximately 1½ in. in diameter, edematous and congested. There were no signs of peritoneal inflammation nor bands. The colon appeared to be normal.

Postoperative Course: Intestinal drainage was adequate by the tube in the ileostomy for one week, then the tube came out, and the drainage from the ileum continued for three weeks. There was considerable excoriation of the abdominal wall. The bowels moved first on the eleventh postoperative day. The enterostomy

wound was closed on the twenty-fourth postoperative day. The weight at operation was 7 pounds 3 ounces; on discharge 7 pounds 4 ounces, and two months later it was 9 pounds 12 ounces. When last heard from the child takes a normal feeding, has two to three stools daily and the only discomfort is an occasional attack of abdominal colic.

CASE 2.—DUODENAL.—M. B., aged 1 month, male, birth weight 6 pounds. Admitted to hospital 1/3/31. Weight 6 pounds 3 ounces.

Complaint: Vomiting shortly after birth and during first 48 hours. Vomiting stopped for 3 weeks, then it began again, became projectile and followed each feeding for past 5 days. Not relieved by atropine. Vomitus bile stained. Stool on day after admission soft yellow.

Examination Abdominal: Distended in upper part with visible waves of peristalsis from left to right. A large soft mass in right upper quadrant.

X-ray: (Fig. 2.) Gastric dilatation, stenosis almost complete at distal duodenum and slight pyloric stenosis.

Fig. 1.—Case 1. Barium does not extend beyond the sigmoid, except for a small amount in hepatic flexure. Colon distended and constricted in sigmoid region.

Preoperative Diagnosis: Congenital stenosis of duodenojejunal junction with possible hypertrophic pyloric stenosis.

Anesthetic: Local field block infiltration 1 per cent novocain.

Operation: Posterior gastroenterostomy between stomach and upper jejunum.

Findings: Duodenal dilatation from obstruction at duodenojejunal junction. Stomach contained bile stained fluid. Cause of obstruction not determined. Pylorus appeared to be normal.

Postoperative Course: Normal postoperative recovery with gain in weight, cessation of vomiting. Breast milk begun day after operation two ounce feedings. Weight at operation 6 pounds, 8 ounces, fourth post-operative day weight 7 pounds, 13 ounces, temperature, pulse normal; six yellow greenish stools. Average daily clysis of 3 per cent glucose and normal saline of 250 c.c. total. Eight days after operation, and in fifth week of life, began to lose weight, having severe diarrhea, pancreatic stools, weight 6 pounds, 14 ounces. No vomiting. On fourteenth post-operative day weight 5 pounds, 12 ounces; 8 stools; regurgitates some of feedings; temperature 100°, pulse 128. Formula changed frequently taking 3 oz. every 4

hours. Vomiting ceased. On the twenty-third postoperative day the wound which had not completely healed began to discharge intestinal content of partly digested food, very same character as stool. Feedings supplemented with clysis of Ringer's solution and glucose. Wassermann negative. Wound broke open, and there was a visible loop of intestine with a small perforation. This opening increased rapidly, and it could not be controlled by packing with acid mixture. On twenty-sixth postoperative day a second operation was done under local infiltration; the perforated area of small intestine was resected, and an end to end anastomosis was done. Child in poor condition, but seemed to stand operation well. Temperature began to rise in 12 hours, and death ensued in 24 hours.

Autopsy findings: General peritonitis immediate cause of death. Duodenal stenosis at duodenojejunal junction. Lumen of duodenum approximately ⅛ in. in diameter, caused by angulation of duodenojejunal area from the position of the duodenojejunal portion of gut. The cecum had rotated only to the right upper

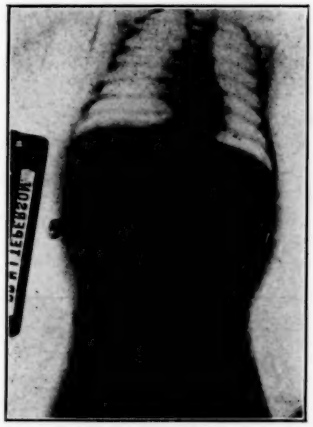


Fig. 2.—Case 2. Showing stenosis almost complete at distal duodenum and gastric dilatation.

quadrant and its blood supply and attachment terminated just to the right of the midline, and the duodenum bent sharply to the right at this point and coursed downward into the right abdomen. In this loop about 4 in. from the duodenojejunal junction there was a closed jejunojejunostomy which had not leaked. And from this point the loop continued for about 4 in. to be joined with the stomach through the mesentery of the cecum and ascending colon in an operative gastrojejunostomy which was healed with an adequate stoma. The pylorus was firm, white, very much thickened, and the usual hypertrophic pylorus of early infancy. The duodenum was very much distended, and filled with bile, the lumen did not contain a diaphragm, but the entire gut was uniformly constricted at the point of angulation, and this portion of the duodenum did not pass posterior to the peritoneum to appear beneath the colon, but it was turned to the right of the cecum, and was lying free in the abdominal cavity throughout its course.

Case 3.—L. O., aged 7 days, male. Admitted to hospital 3/13/32.

Symptoms: Vomiting since birth, after feedings, projectile. Moderate loss in weight, kept up by clysis. Stools of meconium; no curds.

Abdominal examination: Uniform, no distension; no tumor mass felt; gastric peristalsis visible.

X-ray: (Fig. 3.) Complete duodenal occlusion in the first portion.

Preoperative diagnosis: Duodenal occlusion.

Operation: Anesthetic—Local field block. Procedure: Freeing of bands as in Fig. 4 with passage of tube from mouth through the stomach and into intestines, thereby establishing presence of open lumen in duodenum when bile flowed from the tube.

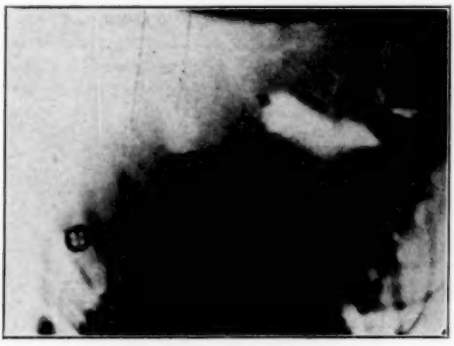


Fig. 3.—Case 3. Complete duodenal occlusion at first portion.

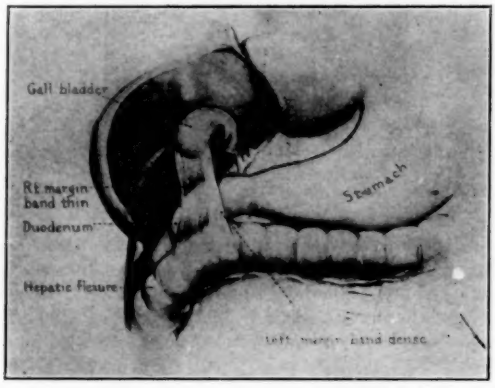


Fig. 4.—Case 3. Freeing of bands.

Findings: A dense band extending from the hepatic flexure of the colon across the duodenum and attached along the gall bladder surface. This band constricted and indented the duodenum so as to cause an obstruction.

X-ray postoperative—as in Fig. 5—showing the tube to extend into the jejunum.

Postoperative Course: The child was fed by syringe through the tube for four days without regurgitation. Because of the fear of pneumonia the tube was withdrawn on the fourth day and feedings begun by mouth. Vomiting occurred at

irregular intervals for a week with little or no gain in weight. This gradually subsided and the infant has developed normally to date without vomiting and capable of taking a normal diet.

Fig. 5.—Case 3. Postoperative. Showing tube extended into the jejunum.

SUMMARY

1. Familiarity with the most frequent sites and types of congenital occlusion is a distinct advantage in the diagnosis and treatment of these conditions.

2. With the present addition of two successful cases, bringing the total number of successes up to eleven, the condition should not be considered hopeless.

3. The preoperative administration of sufficient fluids with glucose and sodium chloride to insure a restoration of these substances in the body fluids is of prime importance, and 6 to 12 hours spent in preparation is permissible in view of the probable lack of gangrene in this type of occlusion.

4. Gastroenterostomy for occlusion of the first portion of the duodenum, duodenoplasty for midduodenal lesions and duodenojejunostomy for those in the third and fourth portions; and for jejunal occlusion a side to side anastomosis, with the addition of jejunostomy by catheter above the anastomosis, and ileocolostomy for lower ileal lesions with the addition of an ileostomy, are suggested as being the procedures of choice for operating upon patients with occlusion. For extrinsic obstruction the procedure employed in Case 3 recommends itself as being conservative, avoiding opening the duodenum and thereby reducing very materially the operative mortality risk.

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THE SIGNIFICANCE OF OBSCURE ABDOMINAL PAIN IN THE OLDER CHILD

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PERSISTENT vague abdominal pains are a comparatively frequent complaint in the older child. The pain occurs periodically, is of variable duration, and at times is very intense during the attack.

It is quite too intense to be ascribed to psychic, emotional, or environmental factors.

The location is usually umbilical or in the right lower abdominal quadrant. These children are generally free from acute or chronic alimentary disease and are often in a good state of nutrition. A striking feature is the great infrequency of acute or chronic organic disease.

This complaint is seldom observed in children under three years of age and is most commonly observed between the ages of six and fifteen years. Female children are more frequently affected than males.

The length of time the pain is complained of varies and may be for the period of a month or may extend over a period of years. The duration of the pain may be momentary or may be prolonged in character. It may occur daily or at less frequent intervals. The nutritional state of the children is generally fair or may be even good. A rather small percentage is of the asthenic type.

In forty-five cases of chronic abdominal pain taken at random from the hospital files of the pediatric department, the following disease incidence was noted: Syphilis, or acute or chronic forms of tuberculosis as evidenced by the Mantoux test and x-ray findings were found in only four of the cases. In none of the cases was there abdominal or peritoneal tuberculosis. In three of the cases, all females, tabes mesenterica was found. Chronic pulmonary nontuberculous conditions were found in only two cases. Chronic cardiac disease in two cases and liver and splenic enlargement in two others. Acute or chronic appendicitis had been diagnosed in six of the cases and in two of them appendectomy had been performed. Pyelocystitis was found in some cases, none of which showed any urinary anomaly.

In two of the cases there was renal stone. Pelvic disease was found only once. This occurred in an older girl and was probably due to a cyst. Gastric or duodenal ulcer was found in two cases, both of them boys, one aged eight, and the other fourteen and one-half years. Very few of these cases have febrile reactions.

A history of dietary indiscretion, improper food intake, or bad dietary habits is obtained in many instances and was found in nearly 30 per cent of the hospital series mentioned.

In only a small percentage of the cases psychic and emotional factors are found to be a dominant factor.

Chronic constipation is found to be a frequent symptom. Probably over one-fourth of all the cases will show it. Diarrheal disturbance on the other hand is very infrequent. Intestinal parasites are very seldom found. Occasional nausea and vomiting is found in over 50 per cent of all cases but never assumes violent or dangerous proportions.

The outstanding feature of the condition is the relative absence of real organic disease, either enteral or parenteral and the absence generally of any pathologic processes. The probable cause for the manifestations of the transitory attacks of pain is doubtless some form of enterospasm and in most cases the development of various degrees of meteorism.

That the condition and the symptoms are not always due to such comparatively simple causes and of such benign origin, is illustrated by the following four cases:

CASE I.—J. K., male, aged fourteen and one-half years. In 1918 the father was treated for duodenal ulcer. The mother was under observation for the same ailment. The past history of the child was unimportant, except for measles and chickenpox. Lobar pneumonia at the age of three was followed by tonsillectomy.

Appendectomy was performed six years previously because of irregularly occurring cramplike abdominal pains, appearing in the epigastrium at two to three weeks' interval and lasting for four or five days. During the attacks there was a loss of appetite and weight. Both were regained quickly between attacks. Nausea at times accompanied the pain. Appendectomy afforded no relief.

The patient first came to the clinic in January, 1931. At that time there were no abnormal physical findings; an x-ray of the chest showed a normal picture. Gastric analysis showed 0.16 per cent free acid and 0.32 total acid.

The patient was again seen in January, 1932. The history obtained at this time revealed that since the appendectomy the patient was troubled with fleeting and sporadic attacks of upper abdominal distress which lasted for short intervals.

During the last four years the attacks of distress had become more frequent and at times were quite severe. The periods of pain lasted for about ten days and there were at least three severe attacks during the year.

The attack for which the patient was admitted to the hospital this time was most severe. The pain was chiefly epigastric and well lo-

calized. It occasionally radiated to the right side and the right lower quadrant. The pain was intermittent and often had the character of a sharp boring pain. It occurred mostly near midnight or toward morning.

The pain disappeared promptly upon eating but seemed to grow worse when beef or sausage was eaten. The use of sodium bicarbonate relieved the pain promptly. There was much belching and occasionally some vomiting. The vomit consisted of sour tasting liquid. There was considerable relief after vomiting.

There was often abdominal distention in the upper abdomen accompanied by a sense of fullness and a disinclination to take food. The weight loss had been about eight pounds. The mother stated that the child had at one time been slightly icteric.

Physical examination showed marked distention in the upper abdomen with definite sub-xiphoid tenderness and some tenderness over the right rectus muscle. There was no tenderness over the appendectomy scar.

Gastric analysis following histamine test showed free acid ranging from 31 to 110 and a total acid value of from 41 to 116.

Gastroduodenal fluoroscopy showed marked deformity of the duodenal bulb and dilatation of the second part of the duodenum, and gave a very clear cut picture of duodenal ulcer.

The patient was placed upon ulcer management of the Sippy type and since the end of January has been practically free from any attacks of pain or distress and has gained over twenty pounds in weight.

Case II.—O. G., male, colored, aged fourteen years. The patient was brought to the hospital in January, 1932, for intermittent attacks of hematuria with abdominal and lumbodorsal pain.

The first attack of hematuria occurred one and one-half years ago following an injury to the left side of the back where he was hit by a stone. The hematuria lasted for six weeks and was followed by persistent albuminuria. Renal function tests, blood chemistry, and cystoscopy failed to reveal any pathology. Subsequent attacks of hematuria followed exposure to cold, draughts, etc., as well as yearly attacks of hay fever.

The attacks of hematuria were accompanied by pain, fever, vomiting, and considerable prostration. During the present attack, intense pain was experienced in the lumbodorsal region radiating down to the scrotum. It was accompanied by nausea, diarrhea, and extreme prostration. Morphine was given to relieve the pain.

There was a history of several of the childhood diseases, numerous upper respiratory infections, and several operations. Bronchopneumonia followed pertussis at the age of ten months. At the age of five years, the patient had a questionable attack of scarlet fever and following it a retropharyngeal abscess.

Two years later an attack of acute appendicitis necessitated operation. A gangrenous appendix was removed. At eight years of age, a severe sinusitis (frontal) developed and was complicated by an orbital abscess which necessitated removal of the orbital plate of the left frontal sinus. Later a submucous resection and aspiration of the sinuses was performed. Severe upper respiratory infections and hay fever have been present for the past four years.

The physical examination upon admission was essentially negative. The boy was well developed and well nourished and showed no manifest cardiac, respiratory, or renal disease.

Blood count, blood chemistry, and renal function tests were normal, but the urine showed numerous blood cells. The Wassermann, Kahn, and Mantoux tests were negative.

X-ray examination revealed a large calculus in the left kidney region. Skiadan injections showed generally dilated calyces of the left kidney as well as the calculus. Pyelotomy was performed and the calculus successfully removed. The stone measured $1 \times 1\frac{1}{2} \times \frac{1}{2}$ cm.

The boy made a complete and rapid recovery and has shown no hematuria or complained of pain since the operation.

CASE III.—L. P., female, aged sixteen months. The child was brought to the clinic in October because of recurring attacks of fever, vomiting, prostration, and vague abdominal pain. A physician had diagnosed the disorder as pyelitis.

The first attack occurred three months previous to admission and was characterized by temperature rises of 39 and 40 degrees Centigrade, vomiting, and frequent, scanty urination. The child was very restless and screamed frequently as if in pain.

Following this attack, the urine was cloudy, but no hematuria was observed. Urination was not painful.

Several attacks followed this first attack, occurring at intervals of two weeks and lasting from three to five days. The child has had none of the exanthemata but is subject to frequent attacks of coryza and tonsillitis.

Physical examination showed a pale, undernourished child with mild upper respiratory infection. In every other respect the physical examination proved to be entirely negative.

The blood count showed a moderate secondary anemia, but no leucocytosis. Repeated urine examinations showed many pus cells in every specimen.

A uroselectan study of the genitourinary tract showed an area of density in the left kidney region. A diagnosis of left-sided renal calculus was made. Nephrotomy was performed and a fair-sized calculus was removed. The child's recovery was uneventful. There has been no further complaint of abdominal pain.

CASE IV.—V. H., female, aged ten years. The patient was brought to the clinic in February complaining of intermittent abdominal pain in the right lower quadrant and over the umbilicus. She had complained of periodic abdominal pain for the last five years. Nausea and vomiting generally accompanied the pain. The pain generally localized about the umbilicus and radiated to the right lower quadrant of the abdomen.

The eating habits of the child were very irregular and there was much tendency to overeating. Ova and parasites of oxyuris had been observed in the stool.

Upon admission the child showed a slight upper respiratory infection with slight fever and some nausea and vomiting. There was considerable complaint of abdominal pain with definite muscle spasm over McBurney's point and exquisite tenderness to palpation over and near the umbilical region. Rectal examination was negative.

The child has had several of the exanthemata but has recovered well from them. The antecedents are sound and healthy. The nutritional state of the child was good. Except for the abdominal findings and a slight sore throat and upper respiratory infection, the physical examination was quite negative. The blood picture was normal with a leucocyte count of 10,000. Urinary and renal examinations showed nothing abnormal.

Exploratory operation was performed and revealed a slightly inflamed appendix, not fixed by any adhesions, and a small tag of omentum strangulated and inflamed and caught in an old umbilical hernia.

Both the appendix and the strangulated omentum tag were removed. The child made a rapid and complete recovery and has had no abdominal complaint since the operation.

In the uncomplicated cases of this disorder the most successful therapy consists in dietary regulation and the liberal use of belladonna preparations. Psychiatric measures are very useful in some cases.

The diet should be low in residue, should contain an excess of protein and be kept low in mono- and disaccharides and the acid fruits. The preparation of the food and the correction of bad feeding habits are not unimportant. To such comparatively simple measures most of these cases will readily respond unless complicated by definite organic pathology.

WHAT IS DEMENTIA PRAECOX?

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THERE is probably no term in the realm of poor mental health associated with so much discouragement and mystery and hopelessness as the term dementia praecox. No one form of mental disorder has been the subject of more study on the part of medicine and the behavioristic sciences. It has been a keen disappointment to every group of society that this subtle and devastating behavior disorder has not been found associated with causal factors that were amenable to a vaccine or polyglandular treatment or surgery or psychoanalysis. It would be impossible within the scope of this limited paper to give even a modest discussion of the fields of research that have been carried on concerning the study and treatment of this curious condition of mental abnormality. One can only outline briefly the various biological and psychobiological approaches and present in summary the ingredients of their results for what they are worth to the physician from a mental hygiene and psychiatric point of view. The term was first used by Kraepelin in 1896 in an attempt to differentiate dementias associated with old age and syphilis and other physical deteriorating processes from a form of mental disorganization occurring early in life. The phrase dementia praecox is unfortunate because many patients showing some of the reactions of this whole group never develop into a permanent dementia; second, because the so-called "dementia" may develop years after the adolescent period, in the thirties and forties and even fifties; and third, because the phrase when once used carries with it the hopelessness of malignancy. It was for this reason that Bleuler in 1911 coined the term schizophrenia. The word schizophrenia comes from two Greek words which imply the splitting of the personality. Every individual has two selves—the self that lives and functions in the world of reality, and the self that lives and functions in the realm of fantasy, daydream and esthetic satisfaction. In the so-called normal personality these two selves exist in a well-balanced relationship. We live and work and play in the world of reality, but its satisfactions are balanced by the satisfactions that come to us from the esthetic and mystical and spiritual side of our natures, ministered to by poetry and art and religion and daydreams of hopes and ambitions concerning things about ourselves that reason tells us will never be fulfilled. In the so-called normal individual the fantastic side of human experience contributes inspirationally to the

concrete working realistic self. In the schizoid (introverted, in-growing) personality we see individuals who from childhood on find more satisfaction in the world of daydream and fantasy, and unreasonable expectations and make-believe than in the world of reality. From their earliest history of development we notice that they shrink from the contacts of reality at home, at school and among the social group to which they are expected to adapt themselves with pleasure. They are odd, asocial, stand-offish children, adolescents and grown-ups who go through the performances of home contacts and school activities and social relationships and earning their living in a more or less perfunctory manner. But their personalities never seem to get en rapport with their environment. As life piles up on them with all its necessities for progressive adaptations they retreat more and more into the world of unreality and fantasy and daydream for their satisfactions and interests. Some of these individuals carry on throughout life without any conspicuous break in their working and social adjustments. Others are unable to do this and retreat into a world from which the concrete realities are shut out to the extent that they live their daydream and fantasy in which they conceive themselves existing in a realm populated with imaginary people and activities. In other words, they get to a state in which they become a part of their daydream. It was this process of gradual and progressive dissociation within the personality of the individual that Bleuler characterized as the schizophrenic reaction. In other words, he urged the use of the term schizophrenia which characterized a process, rather than the term dementia praecox characteristic of the end state of only a percentage of cases.

The factors which lie behind this reaction, whatever name one wishes to call it, are not at all clear. It has been stated on good authority that at least 50 per cent of such cases have a family record of mental illness, more commonly found in brothers and sisters than in parents and children. Heredity may play a rôle, but at least it is not a primary one. Kraepelin advanced the theory that the condition was associated with a metabolic disturbance incident to the gonads, and in support of his theory emphasized the great frequency with which early symptoms appeared at puberty. Mott and others enlarged this theory of endocrine changes to include all the glands of internal secretion, especially the adrenals and the pituitary. The pathological studies of Mott and his followers are still in a very controversial stage, in that equally good authorities describe similar gross and histological changes occurring in individuals who showed no abnormal mental disturbance. Kretschner in a study of 175 schizophrenic patients found only 34 of a "dysplastic" physical type. It is certainly very doubtful whether the endocrinopathy described can be regarded as more than an accompani-

ment of a general psychobiological deficiency with its tendency to mental and physical infantilism. Cotton of New Jersey has felt that he has established a definite causal relationship between dementia praecox and focal sepsis, but his work and results have been unduplicated by anyone else in the field.

The most generally accepted etiology today is that advanced by Adolf Meyer and his pupils who believe that schizophrenia represents the accumulation of lifelong faulty habits of adaptation in the setting of an inferior psychobiological endowment with a great variety of physical pathology increasing the individual's load of handicaps. This theory is based on years of careful studies made of the life histories of patients long before they showed anything that could be termed a breakdown. It is the most constructive approach to this great group of behavior disorders because it offers parents and teachers and doctors and other members of society who come in contact with childhood and adolescence, an opportunity to recognize and work with faulty habits of adaptation with the goal of finding out what kind of environment will give handicapped personalities their best chance of wholesome development. Bleuler early pointed out the fact that the shut-in, introverted, or in-growing or schizoid type of personality is by far the most susceptible to development of schizophrenia and dementia praecox. In the early nineteen hundreds Hoch and Amsden corroborated this theory in a careful study of several hundred cases from the New York State Hospital system. From the mental hygiene standpoint we might attempt to classify these childhood types of personality as follows: (1) The apathetic, pepless, absent-minded, daydreaming, "backward" child. (2) The bookish, serious-minded, docile, prudish child whose precocity seems unbalanced by any social assets and play interests. (3) The whining, "neurotic," aggressively egocentric child with violent outbursts of temper, motivated by unintelligent negativism. (4) The Peter Pan type of child who growing into adolescence and youth remains emotionally immature.

In two previous papers I have attempted to discuss behavioristic problems arising from the intellectually handicapped and biologically handicapped child. The expression of their difficulties is in more or less concrete symptom pictures that flag the attention of teachers and parents and physicians. But the symptom pictures of the emotionally and temperamentally handicapped child are so much a part of our ethical systems that the environment sees no problem at all until the faulty reactions are so far under way that little can be done to change them. The quiet, docile, unobtrusive, bookish boy or girl is commonly regarded as a "model" child. Parents frequently remark in the course of giving the history of a schizophrenic young man or woman, "I can't

understand this breakdown. He was the easiest child of all to raise—never gave us a moment's worry, and his teachers will tell you what a wonderful child he was in school." This point of view is so characteristic of adult conceptions of childhood growth and development that take for granted all is going nicely according to the standards of satisfactory conduct and the passing of school grades. Comparatively little attention is paid by home or school to what constitutes a well-rounded personality equipment as evidenced by a child's ability to enjoy play and social contacts with his fellows. In the out-going child the imaginative qualities grow and develop year by year expressing themselves in action. In the child of in-growing personality the imaginative qualities do not express themselves in activity, but remain bottled up in daydreaming and preoccupations of all sorts. Herein lies the danger that as life goes on with the progressive necessity for more and more action, the adolescent and youth finds himself less and less able to face and meet reality. The major part of one's satisfactions are found in the concrete bread and butter world, and the individual at 15 or 20 or 25, who has grown from childhood with infantile habits of adjusting himself to reality is in a bad way. He is conscious of a tremendous discrepancy between his capacities to achieve and his ambitions. He feels strange and ill at ease in environments that are critical and insistent and non-understanding. In his helpless confusion he may retreat progressively into preoccupation and brooding with gradual inability to concentrate even to the point of carrying out habits customary to his daily life, or, under the pressure of increasing strain, he may plunge headlong into some great scheme or wild debauchery; or, goaded by continuous failure in everything that he tries, he may gradually rationalize his inadequacies with suspicion and misinterpretations, bringing in imaginary voices and mystical influences of electricity and mind reading.

When the individual has reached these stages the outlook for permanent reconstructive therapy is not good. Time and relief from strain and the construction of a simple program may bring about an elimination of acute symptomatology and enable him to float for years outside of a psychiatric hospital. But the constructive approach to the schizophrenic's difficulties must be made long before he shows symptoms which attract the attention of the environment as pathologic. I have in mind a girl of 15 who was brought with the following story. She was the second of three children. Her parents were in comfortable circumstances. She was a quiet, easy-to-get-along-with child who led her class in school and always did what was expected of her until twelve years of age. She never cared to play with other children, was punctilious in all her duties, was so orderly about her belongings and particular about her appearance that she was teased

and called "a little old maid." At twelve years she became apathetic and pepless, even in comparison to what she had been before. She fell behind in her school work, would not get up in the morning without great effort, became irritable with crying spells and explosions of temper. The family doctor advised her parents to take her out of school until puberty; this occurred at 13. During the year that she was out of school her habit life declined markedly. She would lie in bed until ten or eleven o'clock every morning. She became careless of her personal appearance. Her only interest was sitting around the house reading. She was put in boarding school with instructions to see that she "spruced up." Her work was very poor, and she was at odds with everyone because of her dilatory behavior. In January of her fourteenth year she complained to her parents that she had a peculiar odor due to halitosis. She was taken from dentist to dentist who found no halitosis. A few of them treated her for it, hoping that she would react favorably to this therapeutic suggestion. She did not. Her tonsils were removed, following a gastrointestinal upset an appendectomy was done and a good appendix removed. That summer she was tutored and scolded. The following fall she was sent back to school, and at Christmas the family were notified that she could not be tolerated any longer because of her odd behavior. She would sit in a corner of the classroom and stare into space, burst out laughing in the middle of chapel service, and would not eat in the dining room with the others. At the time the child was seen at fifteen years she showed silly laughter, odd posturing and had auditory hallucinations. She is now on the chronic ward of a private sanitarium where she will probably spend the rest of her life.

In dealing with such individuals in the mental hygiene stage of their childhood, what should environment try to do? Here lies one of the greatest fields for mental hygiene research, and it is practically untouched. The first step is recognition on the part of environment of the personality it has to deal with, so that instead of featuring such a child as a model of conduct, we should endeavor to socialize the behavior. The next step is to study ways and means of attempting this socialization. One cannot drive such a personality into enjoyment of group contacts. But environment of home and school can, I believe, do a great deal to encourage such a child to develop different interests. Parental and teacher pride in bookishness should not be featured. Time at home and at school should be given to developing ways and means of baiting such a little creature to play and mingle with other children of her age. It is not a sleight-of-hand procedure but requires patience and common sense and intelligence. Here is a great opportunity for athletic teachers and playground workers who too often spend their energy and thought in the development of good

material for teams, rather than in seeing to it that every child under their supervision is encouraged to play. A small, well-selected camp where counselors and director are thoroughly aware of such a child's difficulties is oftentimes very helpful.

It is in dealing with the temperamentally handicapped child that formal education shows the weakest side of its system. The sagging of child and adolescent in his school performance is too often treated as an ethical lapse of conduct instead of a symptom to be studied and interpreted. Room teacher and principal and school psychologist are interested chiefly in the child's intellectual ability to carry on his work as determined by intelligence tests and educational tests. If he standardizes satisfactorily in such performances, educational authorities conclude that he is lazy. For example, I have seen the following sentence on the June report of such an adolescent boy from a so-called progressive preparatory school, "Your son is intellectually brilliant according to all ratings in our psychological tests. We feel that he has within him the possibilities of leadership, but he is lazy and childish. Time and work are what he needs." Here was a boy whose averages in five different subjects during the year were around 50. Whereas in preceding years his averages had never fallen lower than 85. His demerits had risen from an average of 25 in preceding years to 127 in one year. There was no mention as to what these demerits were for, but an investigation of their cause showed that they were given for absence and tardiness from classroom and athletics, for explosive outbursts of irritability and tantrums when called on to recite. It was found that he would sit in his room of a morning and read a magazine instead of going to classes because he felt that fellow students were looking at him in a peculiar manner which he thought was associated with his lack of physical development and a peculiar expression in his eyes. On several occasions, he had gone to the school physician, complaining of fatigue and sensations of flushing and coldness over his body. He had been diagnosed as neurasthenic on the school health card with the intimation that he was utilizing imaginary ailments to escape the drudgery of school work. The school physician and faculty did not ask themselves why an adolescent formerly ambitious, punctilious in a sense of responsibility, and conscientious in mental attitude should, within a year's time, slump so seriously in his habit life. They were either too busy or too behavioristically unintelligent to make a few inquiries into what the lad was doing and thinking about and worrying over. It is so easy for us grown-ups to project upon childhood the complexities of our own rationalizations and conclude that the individual is "putting on." Playing oppossum is in my experience a rare characteristic of healthy, aggressive childhood and adolescence. The world is so full of interesting and intriguing activi-

ties that the growing boy or girl who retreats from them into nervous invalidism and hypochondriacal complaining and inertia is, in nine times out of ten, pathologic behavioristic material to be watched and studied from an interpretative standpoint.

The mental hygiene period of the schizophrenic is practically the only constructive period for therapeutic helpfulness. It calls for intelligent teamwork on the part of physician, parents, school faculty, and every other member of the environmental personnel. We shall make little progress in combating the development of the so-called dementia praecox reaction until we are all willing to take time and patience to study the well-rounded development of growing childhood. The physician seems in a peculiarly strategic position to initiate this teamwork.

PARASITIC INFECTIONS IN NEW ORLEANS, BASED ON A CROSS SECTION OF CHARITY AND WELFARE CLINIC PATIENTS WITH ESPECIAL REFERENCE TO THE CHILDREN'S CLINICS

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INTRODUCTION

IT IS generally accepted that certain parasitic infections of the intestine are relatively common in the population in and around New Orleans. These include Endamoeba histolytica, other amebae and intestinal flagellates, Ascaris, hookworm, Strongyloides, and Trichocephalus. Taenia saginata is found from time to time; Taenia solium, rarely; and Hymenolepis nana and the pin-worm (Enterobius), not infrequently. All of these infections, except Strongyloides and possibly at times the pin-worm, are contracted from contaminations introduced per os.

My observations have been made on white patients in the Charity and Welfare Clinics of New Orleans for the past four years, and are based on about 4000 representative cases of this group, which is most liable to incur these infections. The cases are well distributed from three months to forty-five years of age, with about 300 additional cases in the age groups over forty-five years. Males and females are about equal in numbers in this survey. The groups include St. Vincent's Orphanage, St. Mary's Orphanage, St. Joseph's Orphanage, Hope Haven Boys' Home, Child Welfare Clinics, Pediatrics Clinics in Charity Hospital, and the following ward services in Charity Hospital: Pediatrics, male and female medical, and obstetrics.

TECHNIC UTILIZED

Specimens of feces have been collected as fresh as possible, and when immediate examinations were impracticable, the containers have been placed in the ice box. In most cases three specimens have been examined. I have employed both unconcentrated and centrifugalized material in each examination. A long thin smear of feces has been comminuted in a drop or two of physiologic saline on a 40 by 75 mm. slide, and a cover-glass placed upon one portion. A drop of Donaldson's iodine* has then been thoroughly mixed with the other portion

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*Concentrated iodine in 5 per cent aqueous solution of potassium iodide.

and a cover-glass placed on this. In this way both the protozoan trophozoites and cysts, as well as ova and larvae have been "caught" in both their natural and fixed conditions. In only about 5 per cent of the cases in which endamebae cysts have been seen, has it been necessary to employ the Schaudinn-fixation and hematoxylin-staining in order to make sure of the species of ameba. I am convinced of the need to differentiate the pathogenic Endamoeba histolytica not only from Endamoeba coli, but also from Endolimax nana and Iodamoeba, these latter three all being nonpathogenic.

DATA PRESENTED

In general it may be said that relatively few really severe clinical cases of these infections have been found in this population group. About 10 per cent of the Endamoeba histolytica positives manifested symptoms of dysentery or chronic colitis; the remainder had at the time of examination only vague intestinal symptoms or were "symptomless carriers."

Of the intestinal flagellates Trichomonas and Chilomastix were regarded as indicators of disturbed or abnormal intestinal function and not as pathogenes per se. In Giardia infection, however, there were many cases, particularly among small children, in which more or less definite intestinal disturbances were believed to be associated with the presence of this organism.

Only two cases of severe hookworm disease were observed, one an adult male and one a girl of eleven years; the remainder were lightly infected and showed no marked evidence of disease due to this organism. Of the 20 per cent with Trichocephalus eggs in their stools only one, a girl of nine years, had a heavy infection (estimated at ca. 800 worms). This child had a typical hookworm facies. One heavily infected Ascaris case was observed, from which 31 worms were obtained after treatment. Altogether only about 7 per cent of the population harbored this organism. In several cases in children one or two ascarids were apparently causing intestinal disturbance.

Strongyloides occurred in about 6 per cent of this population. Of these 240 cases indirect development (i.e., with a "free-living" generation) was demonstrated only 12 times and the hyperinfective type twice. However, there were 38 cases in which the infection was relatively heavy and was accompanied by loose bowel movement which were relieved upon eradication of the worms with gentian violet by mouth. Up to the present time only 3 cases have proved refractory to gentian violet therapy, and all of these have shown marked clinical improvement.

The pin-worm (Enterobius vermicularis) has been diagnosed by recovery of the eggs from the stool in less than 1 per cent of the population. Clinical symptoms and recovery of the adult worms have been

reported in at least ten times as many cases; such information is probably much more reliable as a basis of diagnosis than recovery of the eggs.

Taenia saginata has been found in about 1 per cent of the group; Taenia confusa once, and Taenia solium not at all. Hymenolepis nana has been found in 4 per cent of one orphanage group (St. Mary's) and in 6 per cent of the Hope Haven group. In St. Vincent's (children up

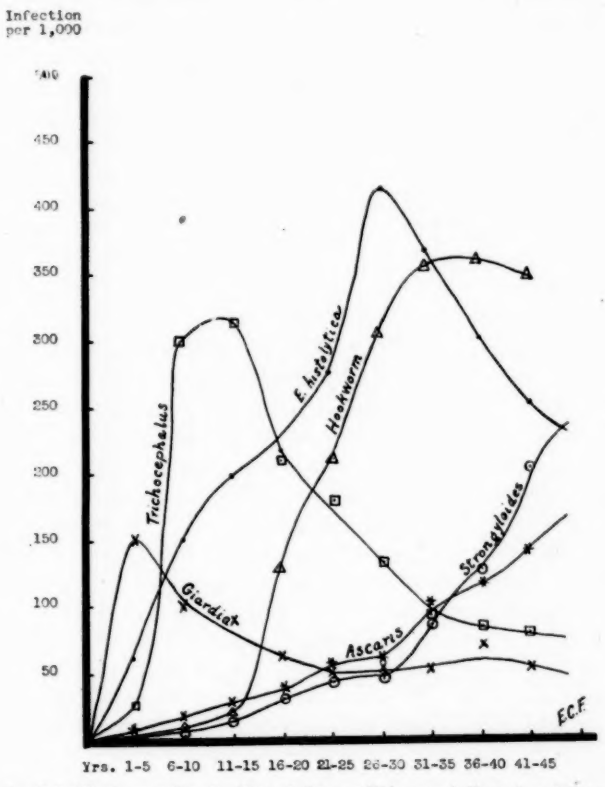

Fig. 1.—Intestinal parasites in New Orleans clinic populations by age groups.

to five years) and in St. Joseph's it has not been recorded. One case of Dipylidium caninum has been diagnosed in a native white child of New Orleans.

INFECTION BY AGE GROUPS

These several infections have been briefly summarized with respect to their relative incidence and the percentages of each which have had demonstrable clinical symptoms at the time of examination. The more common of these can also be studied effectively with respect to age dis-

tribution. Inspection of the accompanying chart (Fig. 1) shows that Giardia is primarily an infection of early childhood (one to five years of age), rising to a maximum of 15 per cent, then gradually descending to 6 per cent in the adult population. Therapeutically it is more difficult to eradicate infections in small children than in adults, favoring the belief that there is a relative age immunity. Trichocephalus is also an infection primarily found in children, with a sharp decline from fifteen years on. Endamoeba histolytica has an appreciable incidence in the one to five year group. A number of cases are recorded of children between nine months and two years harboring the organism. However, in our population it does not reach its maximum incidence until early adult life, then begins to decline rather rapidly. Necator, Ascaris, and Strongyloides are infections which do not become public health problems in our immediate area until after adolescence begins. From fifteen years on, the hookworm curve rapidly ascends, while the increase in the Ascaris and Strongyloides curves is very gradual. There appears to be no definite age immunity or reduction in exposure to these infections during later years, since cumulative infection is necessary to explain the rise in these curves through middle life.

It is of interest to compare this New Orleans series with one of similar kind from approximately 2000 patients from Panama. The age curves (Fig. 2) for Giardia and Trichocephalus are similar in type but involve a greater percentage of the population. In contrast the Endamoeba histolytica curve rises to a peak (30 per cent) in the first ten years, declines in early adult life, and reaches a secondary peak around forty to forty-five years. In the most heavily infected group of the Panama series (Tuira River villages) a peak of 90 per cent is reached before sixteen years, after which the curve rapidly drops to about 20 per cent, suggesting a developing age immunity. The Ascaris and Necator curves reach a maximum of about 75 per cent during early childhood and then show a marked scaling down. The Strongyloides curve rises to a peak (27 per cent) just preceding adolescence, scales down around thirty to thirty-five years and then increases again, much in the same way as the E. histolytica curve.

These data, graphically presented, indicate two things. In the first place, Giardia and Trichocephalus are infections primarily acquired during early childhood, while a relatively large group of the population which will become infected with Endamoeba histolytica acquires this infection during childhood. In the New Orleans population Ascaris, Necator, and Strongyloides are not widespread childhood infections, but develop gradually over a period of years up to middle age.

In institutionalized children an attempt has been made to determine whether the length of residence in the orphanage has had any appreciable effect on the incidence of Giardia and Endamoebae as com-

pared with noninstitutionalized children of the same age. In St. Vincent's (one to five years) there was a 12 to 15 per cent lower incidence of Giardia than in the control group. The Endamoeba infections were too few for accurate computation. In St. Mary's (one to sixteen years) there was an appreciable reduction (4 to 7 per cent) during the second and third years' residence but a marked increase from

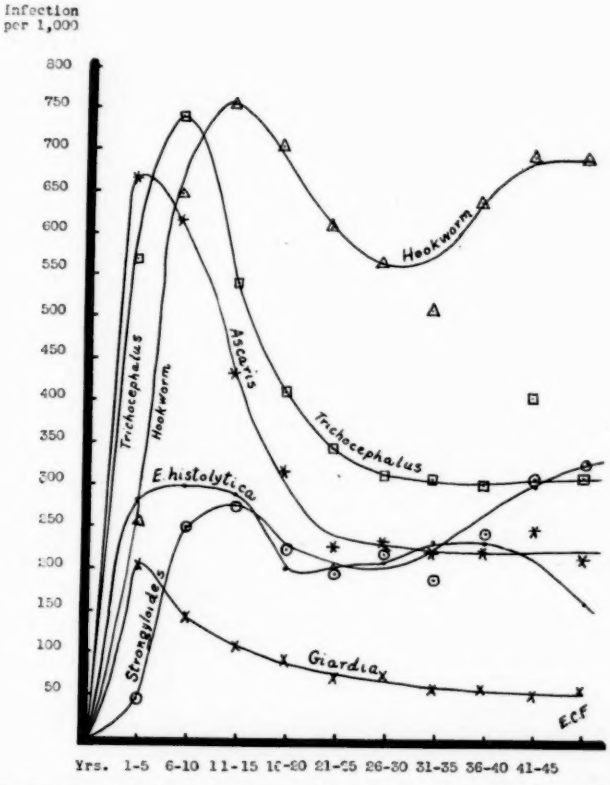

Fig. 2.—Intestinal parasites in Panamanian village and hospital populations by age groups.

the fourth year on. The same statement applies to Endamoeba coli and Giardia infections in this orphanage and to Endamoeba coli and Giardia infections in St. Joseph's (one to sixteen years). In this latter institution only 4 cases of Endamoeba histolytica were found among 75 children examined.

In conclusion it may be stated that there is a high incidence of Giardia and Trichocephalus and a moderately high incidence of Endamoeba histolytica in children of this area, and that the adult

population have a high incidence of Endamoeba histolytica and Necator and an appreciable amount of Ascaris and Strongyloides. However, *the incidence is entirely disproportionate to the parasite burden of the population,* which is on the average remarkably light. This accounts for the relatively few clinical cases of such infestations as ascariasis, the hookworm, trichocephaliasis, and strongyloidiasis. On the other hand, Entameba histolytica and Giardia which multiply in the bowel, although causing manifest clinical symptoms in only a small proportion of the infected population, are potentially graver menaces, particularly in children who constitute a distinctly nonimmune element of the group.

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CHLOROMA

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CHICAGO, ILL.

A STUDY of the literature of chloroma shows discussion still active about the exact nature of this condition. Washburn has very thoroughly reviewed the literature to 1930, and added a case apparently cured by x-ray therapy. Swanson, in July, 1932, reported a case of aleucemic myelogenous chloroma, an unusual finding.

The following case is of interest, because we were able to observe the patient for a few months clinically and then to correlate these findings with those obtained at autopsy. The typical green color of the tumor was only slightly evident and the entire course was aleucemic.

A male child, four and one-half years of age, first came under observation on September 8, 1930 with a history of pains in the knees, arms and occipital region of two to three months' duration. There was a slight fever, loss of weight, anorexia, and pallor which was increasing. At this time his mother noticed a bluish discoloration about the eyes, especially the lower lids. The tonsils and adenoids had been removed three weeks previously because of these symptoms. The throat healed in the usual time and there had been no excessive hemorrhage. Following the operation, however, there had been no relief from the symptoms. The occipital headaches, which were present from the onset, persisted. The ecchymoses into the eyelids increased. There was no enlargement of the superficial lymphatic glands. The past history was negative except for eczema up to six months. There had been no previous acute infectious diseases. The family history revealed that an aunt had died of a brain tumor.

Physical examination on admission to the hospital (September 10, 1930) revealed a rather pale boy of 4 years of age with hemorrhages into both lower lids and a face full and puffy. There were no other hemorrhages. The pupils were equal and regular and reacted to light and accommodation. There was a systolic blow at the apex, probably functional. There was tenderness in the thighs and popliteal spaces; no muscle spasms. The knee joints appeared normal.

At entrance, the blood examination showed 2,500,000 red blood cells, 6000 white blood cells, bleeding time 2 minutes, and coagulation time 4½ minutes. The differential count revealed 52 per cent polymorphonuclears, 48 per cent lymphocytes, some anisocytosis and poikilocytosis, and no immature cells. The white count during the 2½ months never exceeded 12,000 and only on the day before death did the differential blood smear show 1 to 2 per cent myelocytes, the only evidence of embryonic type cells during the course of the disease. Fragility tests were—complete hemolysis at 0.30 per cent saline, partial 0.46 per cent (normal 0.379 per cent). Blood pressure was 104/58.

Early examination of the eyes by Dr. H. Gradle showed a bilateral effusion of blood into the subcutaneous tissues of both orbital regions and nothing more. Examination on October 10, 1930, showed that the retina was very anemic, the blood

From the Sarah Morris Hospital for Children and the Nelson Morris Institute for Medical Research of the Michael Reese Hospital.
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vessel color much paler than normal, and a definite pallor of the temporal ½ of discs. The eyes were quite prominent. This bulging or proptosis (Fig. 1) increased until, on October 18, the eyes could not be pressed back into the orbits. The conjunctiva was inverted and ulcerated. There developed a complete exophthalmus of the left eye with ulceration of the uvea from exposure.

Fig. 1.—Patient just before death, showing destruction of the eye.

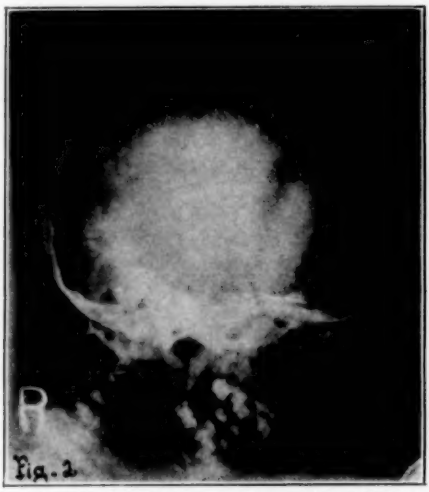

Fig. 2.—X-ray of the skull; note separation of the sutures.

X-rays of the skull, taken by Dr. R. A. Arens, showed no tumor outline within the calvarium. The sagittal and both frontoparietal sutures were markedly distended (Fig. 2). X-rays of the long bones showed a periostitis of the left femur, right femur, left radius, left humerus and right humerus. The impression as a whole was that of a multiple osteomyelitic process. Films of the spine and entire pelvis disclosed a peculiar mottling throughout practically all of the vertebrae, best seen in the lateral view, and also involving the entire pelvis and upper femurs. The appearance was that of a metastatic malignancy. The ribs disclosed erosions both right and left.

Soon after entrance to the hospital the left frontoparietal region became prominent. Nodules appeared on the ribs, sternum, and lower end of the right femur. Severe abdominal pain was complained of for one month before death, which was shown to be from an involvement of the retroperitoneal lymph glands. X-ray therapy was of no consequence. All the symptoms—headache, hemorrhage into the eyes, anemia, and pain in the abdomen—increased, and the child died on November 23, 1930.

AUTOPSY REPORT

The body was that of a well-developed and well-nourished white male child about 4 years old. There was a marked exophthalmus and the corneae and sclerae were grayish and in part necrotic. Both eyelids were swollen and hemorrhagically discolored. The face was edematous and pale. The skin throughout was also pale, but there were no petechiae.

The skin on section was of decreased elasticity and the subcutaneous fat tissue was reduced.

The serous cavities showed no abnormalities. The peritoneal nodes were enlarged, soft and grey. In the left inguinal region, there were large nodes measuring up to 2.5 cm. in diameter. They were very soft, dark grey and showed many areas of hemorrhage. Also in the retroperitoneal space to both sides of the aorta, many large lymph nodes were found, some of which were fused by confluence. On section, they were in part light grey, in part dark grey, almost black, revealing many areas of necrosis and hemorrhage. The aorta in this region was displaced, but there was no invasion of the aorta by tumor.

The heart was normal in size and shape. The myocardium was grey, its architecture being indistinct. The valvular apparatus was intact.

Both lungs were grey. There was no evidence of tuberculosis or pneumonia.

The liver was larger than normal, weighing 500 grams, and greyish. Throughout the surface, a few greyish-white nodules were seen, the largest measuring 12 mm. in diameter. These nodules, however, did not extend into the liver. On cut section the architecture was somewhat obscured. The bile passages showed no abnormalities.

The spleen was enlarged, weighing 125 grams. The follicles were clearly visible. The trabeculae appeared prominent.

The kidneys were enlarged, very pale, and soft. On cut section the cortex seemed larger than normal; its architecture was obscured. The boundary between cortex and medulla was very indistinct. The pelves, ureters and bladder showed no abnormalities.

The pancreas and adrenals revealed no gross changes.

Gastrointestinal tract: The lymph follicles and Peyer's patches in the region of the ileum were larger than normal, elevated and soft, but otherwise no changes were noted in the intestinal tract.

The skull seemed larger than normal. The sutures were very prominent, hemorrhagically discolored and were open in some portions. In many places, between the dura and skull, tumor nodules were found. They were very soft in consistency,

dark gray and reddish-gray. In some portions the nodules were fused by confluence forming large flat tumors which covered the dura mater over large areas. The dura in these portions showed many areas of hemorrhage. The tumor also had eroded parts of the parietal and frontal bones (Fig. 3). Only in the region of the left Gasserian ganglion, the color of the tumor appeared greenish. The larger

Fig. 3.—Skull invasion in the parietal region.

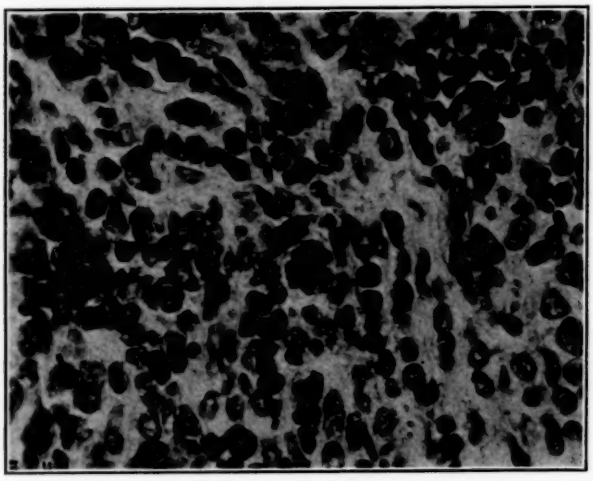

Fig. 4.—Section of tumor in subarachnoidal space; note the mitotic figure. Iron hematoxylin, eosin preparation, ×550.

wings of the sphenoidal bone were bulging. On opening the orbits, a similar tumor tissue was noted replacing the orbital fat tissue. The brain itself showed no gross pathologic changes.

In the region of the ribs, the sternum and the spinal column, many tumor nodules were found similar to those described before. These nodules were confined

to the subperiosteal spaces. Only in a few areas the most superficial layers of the bone were roughened. Parts of the right tibia were also examined. The periosteum was smooth. The bone marrow was dark grey and appeared markedly hyperplastic.

MICROSCOPIC EXAMINATION

Histologically the epidural tumor consisted of round cells which varied in size, shape and staining quality. Many mitotic figures were present (Fig. 4). In general the cells resembled lymphocytes. They were found in part invading the dura and in part invading the bone of the surrounding portions of the skull. Many of the cells were arranged in rows and in small alveoli. Some of the cells showed a distinctly outlined cytoplasm, while others revealed no recognizable cytoplasm. Some of the cells were multinucleated. Some portions of the tumor offered a large amount of necrosis and hemorrhage. In some fields cells were recognized showing a vesicular nucleus and a granular cytoplasm. The granules were in part eosinophilic and in part neutrophilic. These cells resembled myelocytic cells.

Lymph nodes: Many fields showed cells similar to those found in the epidural tumor. Mitotic figures were very numerous. There also were large areas of hemorrhage and necrosis. The follicles were small and not well defined.

Bone marrow: Sections which were taken from the tibia also showed cells of similar type as described before. Also, many multinucleated cells were found here, some of which were apparently identical with megakaryocytes. Cells, typical of myelocytes and myeloblasts were found in many fields. Most of the myelocytes were neutrophilic, but many eosinophilic cells were also found.

Heart and lungs revealed no noteworthy changes.

Liver: Some of the sections showed between the capsule and the liver parenchyma, a new formation of tumor cells which were similar to those described before. The arrangement into rows and alveoli, however, was not pronounced. The cells varied markedly in size, shape and staining quality. Sections of the liver parenchyma revealed a granular cytoplasm of the liver cells and, in some portions, large fat globules within the liver cells. No tumor cells were found within the liver.

Spleen: Sections of the spleen showed the follicles rather small and not very well defined. The germinal centers were hyperplastic. The pulp contained many lymphocytes and large monocytic cells.

Kidneys: The lining cells of the convoluted tubuli showed a moderate degree of cloudy swelling. The capsular spaces of the glomeruli contained a serum precipitate. There was no cellular infiltration.

Sections of the gastrointestinal tract, suprarenals, pancreas, testes and epididymis appeared normal.

Note: The oxydase stain revealed many granules throughout the cytoplasma of many of the tumor cells. The Giemsa stain showed, in many instances, neutrophilic granules, but a large number of cells also contained eosinophilic granules.

The main pathologic diagnosis was *myeloid chloroma* involving the subperiosteal portions of the calvarium and orbits, the ribs, spinal column, the right tibia (other long bones were not examined), the peritoneal and retroperitoneal nodes.

DISCUSSION

The name chloroma has been applied to certain tumors of rare occurrence characterized by a definitely green color. These tumors are usually connected with the periosteum, often involving the bone marrow, and sometimes occurring in lymph nodes and elsewhere in the body. Burgess states that in 1912 about 60 cases had been reported

in the literature. In every instance the disease ran an acute course, usually lasting weeks or months and only once reaching a duration of one and one-half years. Most of the cases occurred in children, a few in infants and some in adults. The average age of the patients is about twenty-three years, and the disease is more frequent in males than in females. The most common symptoms are weakness, anemia, and a tendency to hemorrhage.

Exophthalmus has very frequently been present and has been found to be due to the presence of green tumors in the orbital fossae. Diagnosis has been made during life in several instances by noting the presence of green noduls in the skin or elsewhere. At autopsy, the tumors have been found in various parts of the body. In almost all of the cases nodules have been found attached to the periosteum, often that of the skull, ribs or sternum. In all cases in which the bone marrow was examined it was altered in appearance (green in five cases). Three cases showed merely green bone marrow and no tumors. in one case green bone marrow and periosteal tumors; while usually the distribution of the tumors was more general. Among the more common locations other than the bone marrow and periosteum may be mentioned lymph nodes, kidneys, tonsils and skin.

In a few cases it was noted that the blood clot in the heart was distinctly greenish, and in one the sedimented leucocytes formed a green layer.

Until recent years chloroma was regarded as belonging to the tumors of lymphoblastic origin. In all cases where the blood was examined the stained specimen showed the picture of leucemia.

In 30 such cases 12 showed a high percentage (60 to 95 per cent) of mononuclear cells with nongranular cytoplasm and no granular mononuclears; 8 showed a preponderance of nongranular and a small proportion (less than 10 per cent) of granular mononuclears; while in 10 cases the granular cells, myelocytes, were in excess varying from 10 to 54 per cent. Thus, in every instance, the records may be said to present either the picture of what is ordinarily called "acute lymphatic" leucemia, or of acute myelogenous leucemia, or some stage of variation between the two.

Burgess believed that these tumors did not constitute a pathologic entity but merely a part of the pathologic process in one type of acute myelogenous leucemia. He felt that chloroma had not been shown to have any relation to true lymphatic leucemia.

It is also believed that myelogenous leucemia is a blood metastasis of a true tumor whose origin is in the bone marrow and whose cells invade the blood stream and bone marrow.

In certain cases in which the cells are, most of them, relatively undifferentiated and multiply rapidly, other tissues are invaded. Some-

times in this way definite nodules or masses of tumor cells are formed. These masses, if green, are called chloroma.

The gross anatomic features were first detailed by Burns in 1823. Waldstein was the first to make blood studies in 1883. Dock, in 1893, on the basis of blood and other studies, first pointed out the relationship of chloroma and leucemia and Dock and Warthin, in 1904, definitely established this point.

In 1905 Sternberg divided chloroma into two groups, lymphoid and myeloid.

In 1909 Pappenheim classified the disease into hyperplastic chloroma and chlorosarcoma with related intermediate forms. He regarded leucemic chloroma and myeloma as somewhat similar disease processes of the hematopoietic system.

In 1910 Lehndorff tabulated all cases up to that time, a total of 73, of which 56 were lymphoid and 17 myeloid chloromas.

In 1912 Burgess brought forth strong and convincing reasons to show that chloroma was always a myeloid process. He pointed out that many so-called lymphoid leucemias, if more completely studied, would prove to be acute myelogenous cases. The essential point in differentiation of the leucemias resolves itself into the identification of the large mononuclear cells of the blood and those composing the tumors in chloroma. Askanazy has logically argued the occurrence of only myeloid chloromas.

Brannan has reviewed all cases reported since Lehndorff's paper of which there were 74 including his own case. Of these, 49 were definitely myeloid, but 11 of these were more or less atypical or borderline cases. Only one case was stated definitely to be lymphoid. The remaining 25 cases were poorly studied and doubtful; indeed, some were probably not chloroma at all.

In the majority of the 49 cases considered to be of myeloid origin, the diagnosis was based primarily on the blood picture together with the histologic structure of the tumor tissue and bone marrow. Except for a few cases of aleucemia, there was definite acute or chronic myelogenous leucemia in all. In the vast majority of cases, the cells composing the green tumor masses and bone marrow, as well as those in the blood, were large undifferentiated nongranular mononuclear cells, the myeloblasts; with or without a few or many neutrophilic and eosinophilic myelocytes, the latter being especially numerous. In 15 out of 17 cases the oxidase or peroxidase test was positive.

A noteworthy feature of the color of these tumors is the prompt fading in the presence of light and air, but in tissue fixed in formalin it is generally temporarily restored by the addition of hydrogen peroxide.

Practically all authors, except perhaps Meyer and Berger, agree that the chemistry of the color is unknown. Here and there in the literature it is suggested that it perhaps is a lipochrome. Askanazy considers the green color peculiar to myeloid cells and points out the occurrence of greenish colored pus in support of his idea.

No one has ventured to explain the etiology of the disease.

The anemia was almost always considered as secondary. Brannan concludes that:

1. Chloroma is a myelogenous process; an unusual form of myelogenous leucemia.

2. Aleucemic periods of chloroma are common, whereas true aleucemic forms of the disease are rare.

3. Transitional or borderline and atypical cases occur, which emphasize the close relation between myelogenous leucemia and chloroma.

We have to classify this case as chloroma. Grossly, the involvement of the periosteal spaces of the bone of the skull, especially in the region of the orbit, the exophthalmus, the periosteal changes, the invasive growth, the involvement of the peritoneal and retroperitoneal nodes are characteristic. Histologically, the type of cells, partly resembling myelocytic cells, their arrangement into rows and streaks, their invasive growth, the absence of basophilic granules, and the evidences of malignancy are also characteristic of chloroma. One important feature, however, the green color which gives such growths their name, is not present in our case, with the exception of the tumor found in the region of the Gasserian ganglion which was green. But there are numbers of cases reported in all respects typical of chloromas, but without the green color. These cases have led to the conclusion that the green color is only an incidental finding and is not pathognomonic of chloroma. This is supported by the fact that there are cases of typical leucemia on record which do show green colored infiltrations, but which have no features resembling chloroma.

The blood picture of our case showed, save a moderate anemia and a relatively high lymphocytic count, no changes. In many cases of chloroma the white count is higher than normal, which is especially significant shortly before death. But there are enough cases on record showing at least a temporary normal white count.

Hirschfeld classifies chloroma among leucoses with tumor-like growth and also recommends the term sarcoleucosis. Considering the type of cells in our case, their variation in size, shape and staining quality, the many mitotic figures, the distinct invasive growth, the actual destruction of bone, I personally, would want to indicate the malignant nature of the disease in addition to the systemic involvement, and, therefore, am also in favor of classifying this case as sarcoleucosis.

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104 S. Michigan Blvd.

ANTIQUES OF PEDIATRIC INTEREST

T. G. H. Drake, M.B., F.R.C.P.(C.)

THE pewter boat can be dated from the touch mark which it bears on the interior of the bowl. All sterling silver articles bear a date letter in conjunction with other devices. Some pottery and porcelain articles bear manufacturers' marks from which they can be dated. In most cases, however, their age must be determined from the character of the pottery and the nature of decoration. The distinguishing feature between porcelain and pottery is that porcelain will transmit light while pottery will not.

Pap boats

Left, Pewter, bearing touch mark of William Bancks, 1790; Sterling silver, 1790; Willow pattern pottery, circa 1830; Crown Derby porcelain, circa 1850. Capacity 2½ to 3½ ounces.

Pap was fed from the boat or an ordinary or specialized type of spoon. Pap boats of the type illustrated persisted from the Roman period until the late eighteenth century. Ettmuller, 1698, described a common method of feeding pap at that time:

"The nurses in taking it into their mouths dilute it with their saliva and place it after that in the infant's mouth. Finally, to better dilute the pap and facilitate its digestion, they give them the breast."

Even as late as 1776, Conyers wrote against this particular method of feeding on account of the dangers of infection.

Hugh Smith, 1792, described the amount of pap fed during the first two weeks of life. In the mother's words, "What, allow a child only a pint of milk a day! Why, it would eat two quarts of pap, and still

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cry for more.'' Smith commented, ''Surely it is wrong to put a large boat full of pap into their little mouths, suffering them to swallow the whole of it in a minute, and then from their cries to ply them with another which is no sooner down than it is thrown up again.''

Until the end of the eighteenth century, from the amount of space devoted to exhortions for maternal nursing by pediatricians, one can easily gather that it was not the custom for the mother to nurse her own infant. The infant usually was confided to a wet-nurse or dry nursed. When dry nursing was chosen, the food was frequently pap, and ignorant dry nurses attempted to rear infants from birth solely on a pap made from flour, water and sugar. The widespread use of pap feedings was probably a large factor in bringing about the huge infant mortality of the eighteenth century. In the city and suburbs of London for the period from 1762 to 1771 no less than 62 per cent of infants died before reaching two years of age, while in the foundling hospitals 96 per cent succumbed during the first year of life.

TEETH AND NOURISHMENT

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NUTRITION exercises a very potent influence on the development and decay of the teeth. The diets of certain primitive peoples and some recent experiments on human beings show rather conclusively that dental caries can be prevented or arrested. It is, therefore, desirable that we have a better and more universal understanding of this problem.

A brief review of certain fundamentals is in order.

The teeth are a part of the skeleton; they are the only part exposed to external influences. For this reason and because the enamel arises from the epithelium, they may be classed as exoskeletal tissues.

They are also subject to the influence of the blood stream, nervous system, lymph, and the glands of internal secretion. Thus they may be classed as endoskeletal tissues. Some clinicians are inclined to view the condition of the teeth as a manifestation of the condition of other skeletal tissues.

The denture presents a variety of tissues, perhaps a greater variety than any other organ of the body. Among them we find four types of cells which deposit calcium, the osteoblasts, cementoblasts, odontoblasts, and ameloblasts. All of these and their products are subject to pathologic change.

It is well understood that calcium is essential in the development of sound teeth and, since this is the element with which the dentists are more concerned and in which they are more interested, this constituent in our diet will be discussed more fully than any other.

The enamel is the hardest substance in the body, has a higher percentage of mineral matter than any other tissue (von Bibra—95-97 per cent[1]) and is looked upon by some authors[2] as the first and strongest barrier against caries. The ameloblasts possess unusual selective properties, the utilization of fluorine in the formation of enamel being one of them. This tissue contains more than three times as much fluorine as bone.[3]

A pathologic condition develops in this valuable protective covering of the crowns of the teeth of young children, if an excess of fluorine is present in the drinking water. Mottled enamel, an unsightly defect of the teeth, according to Smith, Lantz and Smith,[4] is found only

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when the water is rich in fluorides (2 to 7 mg. per liter). Such conditions prevail in Colorado, New Mexico, and Arizona. The potable water supply in the Rocky Mountain region is harder than in any other section of the United States.

The dentin and cementum are derived from connective tissue and compare favorably with bone in texture and degree of calcification. They are not formed from cartilage, however, the dentin being built from a papilla, surmounted by columnar cells (odontoblasts) and the cementum being laid down in successive irregular layers by cementoblasts on the outer surface of the dentin.

The dentin and cementum each have a separate matrix and though the two tooth substances are inseparable under normal conditions, by following a careful technic in decalcification[5] the organic matrix of the cementum may be slipped from the organic matrix of the dentin, as a finger stall is slipped from the finger. Histologic evidence points to an impenetrable layer of calcified tissue where these two substances contact each other in life.

The enamel also is believed by most authorities to possess a matrix. The controversy on this subject is woven around its composition and permeability or its channels of circulation.

Since chemical analyses of enamel were first made authoritatively, no one has denied the existence of organic material in the enamel. Its composition, however, is not known. Judging from the microscopic appearance of the enamel, it is laid down in rod-like columns, with perhaps a sheath and some interprismatic cement-like substance holding the columns together.

Whether the organic matrix of the enamel is reticulate in form and thus, as successive amounts of enamel are laid down, it becomes the sheath of these enamel rods as well as the medium through which the interprismatic cement is laid down is a conjecture.

Many workers have proved the permeability of the outer surface of the enamel by treating it with certain chemicals, silver compounds chiefly. This may be but a self-limiting chemical reaction.

Others have forced dyes into the enamel substance through the pulp in extracted teeth, or by incorporating dyes in the food of experimental animals. Such penetration may be caused by blood pressure or by capillary or surface action.

Around this particular phase of this problem, the controversy rages as to whether tooth decay is a result of intradental circulation or the action of the salivary fluids and food débris in the mouth.

While the mouth is defined as a cavity which contains the tongue and the teeth, its topographical limitations are not described. All the structures, tissues, and secretions within the mouth function in catching and masticating the food, in partial digestion of it, and in prepar-

ing it for deglutition. (John Hunter speaks of these three functions in his early writings.) It may, therefore, be classed as an organ.

From the growth and development standpoint, the period of dentition is most active from birth to the age of twelve years and it is also most interesting at this time. Midway between these ages there should normally be fifty-two teeth in the mouth in various stages of growth, eruption, and resorption.

The normal condition is what we should seek to obtain and maintain, because the premature loss of the teeth may bring a trail of deformities and disorders, which will be difficult or impossible to correct.

The infectious diseases of the mouth are frequently found in children and are concomitant with the loss of the teeth. This is another reason why the mouth should be kept in a normal condition at all times.

It is quite generally accepted that the development of the jaws is due primarily to the normal eruption of the teeth and their normal occlusion (in physiologic function). If dentofacial deformities or malocclusion develops as a result of the premature loss of the teeth, or bad habits, permanent physical and social handicaps may follow, which persist throughout life.

It has been estimated that as many children suffer from dentofacial deformities as do from dental caries.

There are two aspects in the destructive effect of nutrition upon the teeth, one, the nonconstructive, whereby the endogenetic processes fail to produce sound teeth because of dietary deficiencies and, two, the destructive, whereby the food itself, in intimate contact with the teeth, undergoes decomposition and produces substances that destroy the teeth. Further, the omission from the diet of certain fibrous foods and fruits, which have a cleansing action on the teeth, may be a factor in causing them to decay.

A confusion of ideas in relation to these two aspects seems to prevail among laymen and professional men who have little interest in the chemical and biologic reactions which take place.

We know that the substances we take in as food and drink can cause sickness or maintain or restore health; we know that sickness may be produced within a very few minutes or it may be the result of a mild, insidious degenerative action, extending over a long period of time, and similarly that health may be restored in a few hours or it may require years by means of the diet.

We know that body cells may cease to function or may die as a result of a dietary deficiency or, if impaired, they may regenerate or new young cells may develop following a change in diet. Odontoblasts and cementoblasts are no exception to this law.[6]

We know that the secretions of certain glands in the body influence or control calcium metabolism to a remarkable extent and that the function of these glands is in part influenced by food intake. Aub,[7] Hess[8] and others have pointed out the probabilities in this field.

We have evidence[9] that teeth sometimes are undeveloped and uncalcified when they erupt and, under extreme conditions, seem almost to melt away when used in masticating food, presumably as a result of malnutrition.

We also have evidence[10] that progressive dental caries can be arrested in temporary or permanent teeth within a few weeks by a selected diet and that it can be induced as quickly by returning to the old diet.

With so many influences capable of altering the tooth structure for better or for worse from the earliest embryonic stages until the loss of the teeth occurs or until death, why should we seek a specific cause for dental caries?

The endogenous factors responsible for the destruction of the teeth, or rather the lack of construction of them, are dietary deficiencies, which, according to Klein, McCollum and Kruse[11] consist of calcium, phosphorus and vitamin D.

"The quality of the saliva is the important thing in determining whether teeth will decay and this is determined by the chemical composition of the blood.

"The saliva acts normally as a buffer so that acid cannot accumulate and break down the enamel of the teeth. It cannot act as a buffer unless it contains a certain amount of phosphorus. There must be a proper calcium and phosphorus ion concentration in the saliva in contact with the enamel to prevent the disintegration of the surface molecules of that substance. No matter how much phosphorus is consumed, unless a certain amount of calcium and vitamin D are also taken in, the quantity of phosphorus taken into the blood will be insufficient."

The direct destructive action of nourishment on the teeth takes place within the mouth. Certain food substances are acidic in character, others are quite easily converted into acids by the ferments constantly present in the mouth. The foods most susceptible to fermentation are the starches and sugars, which constitute a large part of our diet. The ferments are chiefly caused by bacteria; the resultant acids may be of several types but lactic acid, presumably, is the most common acid in the mouth.

Where milk is consumed in so many forms and occasionally is sour, it is very logical to assume that B. lacticus is constantly present. However, there are so many organisms that will produce lactic acid (some

authorities state more than 100[12]) that it matters little whether a specific type is present or not.

The chemico-parasitic theory of decay assumes that lactic acid producing organisms are constantly present in the mouth; that the enzymes secreted by them attack certain foodstuffs or organic material, chiefly carbohydrate; that the organisms find lodgment on the protected surfaces of the teeth, interdental spaces or pits and fissures, and are protected by a mucin plaque from being washed away by saliva or brushed away by fibrous foods. The acid which is generated attacks the enamel rods or the interprismatic cement substance, and may dissolve out either or both.

As cavities develop, the colony has better protection and is, therefore, less easily disturbed. Knowing that these organisms cannot live in a medium of high acid concentration which they produce, the theory is put forth that the acid is neutralized by the alkaline tooth substance and thus the destruction proceeds at a rate determined by the number of organisms present, the food supply, and the advantageous conditions prevailing in the mouth.

It does not follow that lactic acid is the only acid present or that may cause disintegration of the teeth. Saccharic acid, mucic acid, and others are known to be easily produced in the mouth. No thorough investigation of this problem in dentistry has been made.

We recognize that immunity is but a combination of advantageous conditions and among them, insofar as immunity to caries is concerned, are a diet sufficiently rich in alkaline substances and a normal saliva, that is, saliva with a faintly alkaline reaction.

Other adjuncts are fibrous foods which have a cleansing action when passing over the teeth in mastication, foods which are not sticky and thus do not adhere to the teeth, and foods, such as fruits, which leave the teeth free from débris.

It does not follow that these are the only foods which should be eaten but, if they are the last at a meal, there is less danger of the destruction of the teeth by fermentation of food débris.

The rôle which the alkaline ions in foods may play in the prevention of caries is in augmenting the alkaline saliva by neutralizing the acids produced by fermented foods.

The theory that the circulation of the lymph within or through the tooth substance is the principal agency in preventing dental caries is not accepted as yet by the vast majority of the dental profession.

A study of the literature and of the experimental work done indicates that, in the constructive effect of nutrition on the teeth, the primary factor is an adequate intake of the proper foods and the secondary factor is endogenous metabolism.

We must, therefore, look to the diet as a suitable source of supply from which the tooth building cells may derive the nutrient material necessary to build sound teeth. Calcium and phosphorus occupy first place, so far as the teeth are concerned, for without an adequate, utilizable intake the teeth as well as other tissues will suffer.

The list of foods which will supply these is well known and insofar as children are concerned, they are not unpalatable. Any food idiosyncrasy can be met by substitution; refusal of certain foods because of a mental attitude can be overcome by training or discipline.

The protein content in tooth substance is relatively small, 1.3 to 5 per cent. It is found chiefly in the organic matrix of the dentin and cementum. Such analyses of teeth as have been made take no cognizance of the water content, so the actual amount of protein may be lessened considerably in a true analysis.

Fat, quoted at 0.0620 by von Bibra, is of no particular importance insofar as tooth structure is concerned. However, we must not forget that fat provides fuel for the development of energy and cell energy is as important as mass energy.

Carbohydrate, which constitutes a reasonably large volume of the child's food, as well as of the food of adults in most lands, presents a question which is debatable. The White House Conference report on Nutrition,[3] Chapter on Carbohydrate Requirements, states that "a minimal amount of carbohydrate is essential for the metabolism of other foods, especially fats, in order to prevent the development of ketosis.

"The optimal amount per day for children corresponds to from 40 to 60 per cent of the caloric intake.

"The requirements of very young infants for carbohydrate are usually met entirely by sugars. After six months of age a small but increasing proportion is met by starches; after the second year and through childhood, approximately one-half of the total is supplied by sugars and the remainder by starch in the average dietary."

The debatable question is whether sugar other than that found in natural foods should be used. The dentist's experience invariably has been that where a high caloric content of the daily intake is composed of artificial sugars, the teeth disintegrate rapidly. In infancy, one of the most potent causes of dental decay is conceded to be the use of sweetened condensed milk. It is not infrequently prescribed by physicians. The label on the tin of one brand states only the directions for preparing it for infant's food, in several languages. Filipino mothers in Hawaii, following such instructions, wonder why their children do not thrive on feedings of one teaspoonful of condensed milk in eight ounces of water, six times a day.

I have known a pediatrician who not only advocated artificial sugars for children but occasionally carried all day suckers in his pocket to give his patients when making his rounds.

The dentist rarely sees the child until he has reached school age; it falls upon the obstetrician, the pediatrician, and the nurse to undertake the real preventive dentistry service in the early period of life.

The White House Conference report on Nutrition[3] (p. 510) condemns the procedure of supplementing natural foods with artificial sweets.

"In developing the feeding habit, only natural foods and flavors should be used. In modifying milk for the infant with sweet sugars, which is unnecessary, we make a serious mistake. The sweet taste needs no educational effort in its behalf, and might well be left to a later period, when it will be introduced all too soon by civilized custom.

"Sugar with cereal and other solid foods is quite unnecessary. This is not because there is any evidence to prove that sweets destroy appetite, but because they interfere with the normal ability of the child to select a balanced diet for himself."

With these statements, I believe all dentists interested in the prevention of dental disease will agree.

Mineral metabolism, the *raison d'etre* for this paper, is a subject of which there is still much to be learned. Upon certain phases we probably are in accord, viz., that there should be a sufficient quantity of calcium provided in the daily intake to meet the growth demands of the individual and that it should be, insofar as is possible, in an easily assimilable form.

Miles[13] says, "When converted into a diffusible form in the blood stream calcium (a) may be deposited in the teeth and bones, where it becomes relatively fixed; (b) may be deposited in the trabeculae; (c) may pass into tissue fluids, spinal fluid, or body cells; (d) may be retained in the blood stream in control of nerve and muscular irritability; (e) may be excreted."

He further states that "excessive demands for calcium occur (1) during the last half of pregnancy, when the bones and teeth of the fetus are being formed; (2) at the termination of pregnancy with the demand for milk and a corresponding drain on the mother's calcium; (3) during childhood, when there is rapid bone growth. If a deficiency exists, incomplete calcification occurs."

Dental defects, then, may be traced to an altered calcium metabolism, to a deficiency of calcium in the diet, or to the effects of the dietary intake directly upon the teeth.

Is it not conceivable that a diet can be found that will prevent or counteract the condition described as dental caries and at the same time be palatable and acceptable to human kind?

I believe that there is sufficient evidence extant to warrant our acceptance of the nutritional factor as the most hopeful means of preventing this apparently unabatable disease.

May I present some contrasting information in support of this belief, upon which I have formed my opinion. These are the result of personal study and observation or were obtained first hand from the persons named.

Esquimaux on the Pribilof Islands living on an American diet, generous use of sweetened condensed milk on bread, rampant caries; no immune cases.
Lieut. Commander R. R. Crees, D.D.S., U. S. Navy, Chaumont.
Mr. Christopher, U. S. Dept. of Fisheries, Seattle, in charge of Seal Fisheries.

Esquimaux north of the Arctic Circle, where they do not come in contact with American foods, but live chiefly on fish, meat, and berries, no sugar or carbohydrates, have no caries.
Vilhjalmur Stefansson.

Present Hawaiian population, especially oriental children with a diet of rice, sugar, soda pop, few vegetables, very few citrous fruits, practically no milk, ravages of dental caries are terrible. Many cases where deciduous teeth are so lacking in mineral elements on eruption that they are worn to the gums in a few months by relatively non-abrasive diets.

Ancient Hawaiian population, chiefly Polynesian diet, fish, native fruits, and vegetables, very little starch, acid taro, all skulls found show remarkably perfect teeth, both as to structure and functional relations.

Higher class of people in Italy, rich foods, pastes and pastries, sweets and condiments, present plenty of evidence of dental caries and diseases of the peridentium.

Laboring classes in Italy with a diet of whole grain bread, cheese, and wine, vigorous functional activity of the jaws, dental caries is rarely found.

Natives of Japan with heavy rice diet, little milk, known to be universally afflicted with dental caries; no country is making greater effort to combat it by dental methods. Similar conditions are reported in Japanese colonies in California.

Natives of Guam, diet of fish, some meat, native fruits, tortillas, whole ground corn, treated with lye, washed and baked; 83 per cent of school children show very little decay and no pulp exposures.
Ralph S. Hornung, D.D.S.

There are some differences naturally in dietary prescriptions. When based upon idiosyncrasies or upon deranged metabolic processes or an abnormal metabolic rate, there should be deviations. The physician who has informed himself in these matters should be the authority.

Barring profanity and the accompanying adjective, some one has said, "Don't let the damn, dumb dentists dabble in diet."

If they are sufficiently interested in child welfare to desire to prevent dental caries and a suitable diet will prevent it and if they are intelligent enough to understand the problem and interpret the findings, there is no reason why they should not take it up. Surely, there is more justification for a dentist to pursue this study than for an ophthalmologist, a gynecologist, or a syphilologist. It is merely a matter of intelligence and good sense.

For some time it has seemed to me that the good thought, expressed in Bunting's summary[14] on the various researches carried on in this field, chiefly on animals, might well be directed now to the children themselves. Enough experimental data are available to assure us that no harm will follow the pursuit of such a plan. The application of the results of animal experimentation in dieteties to human beings invariably brings up the question, will the results be identical?

The factors of variability in dentition, growth of teeth, types of teeth, difference in form and function; the wide variations in the length of developmental periods, i.e., from infancy to puberty and from adolescence to maturity; the differences in the enzymes; may not these alter the findings, when experimental evidence is applied to man?

Are we justified in accepting the results of a specific type of research, such as bacteriologic experimentation, blood tests, roentgenographic interpretations, salivary analyses as the final determinative factor and using these data as a basis for prescribing a suitable diet for the prevention of caries?

With all of these issues before us, is it not advisable for us to turn our attention directly to the children?

Two opportunities present: (1) the private practice of interested pediatricians and (2) the groups in child caring institutions who are under a liberal form of custodial control. Such institutions should be under the direction of a medical officer, preferably a pediatrician.

The important thing in either instance is full compliance with the established regimen, the most difficult thing to control.

Mothers, during the first decade of the lives of children, have reasonably good control over them, if they can be induced to exercise it. Beyond that period, established habits and an appreciation of the value of a good diet will be the only safeguards until maturity is reached, after which we must trust to the knowledge and common sense of the individual to carry him through life with sound teeth.

In institutions, it would seem to me that a sum of money sufficient to supply the extras needed to provide the essentials in a caries prevention diet over a period of five years would be sufficient to prove or disprove the theory that a suitable diet will prevent caries. There should be no deviation from the plan during the experiment.

In conclusion, may I suggest that the study, promotion, and completion of a plan for the prevention of dental caries will be most effectively carried out by the cooperation of the family, the pediatrician, and the dentist. I bring to you not a duty but an opportunity, as a professional group, to attack this problem of the conservation of the teeth at an age when probably the greatest amount of good can be done.

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Critical Review

GROWTH AND DEVELOPMENT

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THE writer in attempting this series of reviews on the subject of growth and development is faced with a task which seems magnified rather than diminished by many months of study. Since I am not a contributor in this field, what remarks are made about the attainments of the real investigators are to be interpreted merely as the reactions of one whose daily life is intimately associated with growing human beings and whose mind is fascinated by the subject. My function is that of a recorder of events rather than that of an authority. I undertake the task with a proper feeling of respect for the many great scientists who are carrying out active investigations and recognize my limitations as a critic.

Scammon[37] surveyed the work of the last three hundred years on this subject and demonstrated the extent to which our interest has grown. In the sixteenth century only one publication on growth was recorded, in the seventeenth there were 30, and in the eighteenth, 200; in the nineteenth, 2,500; and the first quarter of the twentieth century has already seen 3,500 articles and books dealing directly with this topic. It is of interest that of this number 50 per cent were in German, 20 per cent in French, and only 18 per cent in English. A useful booklet[31] published by the U. S. Department of Labor, lists some 2,500 publications which are of sufficient importance to be abstracted. At the present time, the yearly increment to the literature on growth and development mounts to hundreds of studies. Obviously it would be impossible for anyone to condense such a mass of material into a short article such as this. It, therefore, seemed advisable to split the subject into several component parts and to attempt to bring each one up to date in successive articles to appear from year to year. This policy has met with the approval of the editors.

Since its scope is broadest it seems logical that the first of such a series should deal with the nature of growth, with the facts and theories which have been advanced to explain the phenomenon.

THE NATURE OF GROWTH

The pediatrist owes his unique position in the medical world to the factor of growth, for it was he who became particularly interested in human beings during their formative years when growth processes were active, and it was these processes which made his problems different from those of other practitioners. Not only must he treat his young patients differently because they are growing, but he must look upon his business of life in an entirely different manner for the same reason. His attitude toward his patients becomes less that of a healer and more that of a protector of the child's development, both physical

and mental. This is undoubtedly why preventive medicine has reached its greatest though tardy development in pediatrics.

Although growth is a subject of absorbing interest to anyone who deals with children, our knowledge about its nature is fragmentary. While it is measurable to a relative extent, it is one thing to measure a process and another thing to arrive at an understanding of its fundamental nature. Volumes have been written about the measurement of growth and this will be one of the subjects later to be considered, but we are interested here in a more abstract phase of the problem. What is growth, and how does it come about?

METHODS OF STUDY

Obviously growth is closely tied up with the life process because it is the most characteristic function of living things. Scammon[38] remarks that we may think of growth in two ways, as a process and as the resultant effect of this process. We are interested in interpreting these observable effects so as to explain the nature of growth. Additional light is thrown on the subject by experiments in which growth is modified by external factors such as changes in nutrition, administration of, and withdrawal of endocrine extracts, vitamins, amino-acids, and mineral salts. All of the facts of embryology and heredity have been combed over in search for enlightenment. Tissue culture work has been of great help in our understanding of growth laws, and biologists are at present busy with mathematical computations in the hunt for secrets of this sort.

Errors are likely to be made in the interpretation of the various theories and beliefs about growth unless certain principles are borne in mind. For instance, in evaluating weight increments it must be remembered that equal increases in weight do not have the same significance at different ages. The increase of one pound in an infant may be 10 or 20 per cent of his total weight, whereas in an adult it is less than 1 per cent. Moreover, and what is more important, the increase in the infant consists in growth of different sorts of tissues, brain, viscera, etc. In an adolescent, it will consist chiefly in muscle and bone increment, whereas in the adult it may mean mere deposition of fat. Most thinkers do not include this latter under the heading of growth at all, since fat represents merely a reserve depot of nutritive supply.

Absorption of different chemicals takes place at varying rates in the succeeding growth periods and the chemical composition of growth is beginning to be revealed.[26] One of the simplest phases of the chemical problem lies in the utilization of water by growth. It is well known that young individuals incorporate more water in their tissues than do older ones, therefore, growth uses it relatively freely and the process of senescence tends to reject it. It must be borne in mind, however, that the water thus incorporated, about 60 to 65 per cent of the adult weight, does not exist as that in a wet sponge, but as "bound water" in chemical composition with the colloids of the body. For this reason many of the properties ordinarily associated with water, solvent action and diluting function, do not exist to the extent we might suppose from the results of chemical analyses. As an instance of the importance of water in the chemistry of growth the example of the frog's egg in distilled water has been cited. This minute egg, only a few milligrams in weight, if placed in a dish with distilled,

sterile water, will develop into a tadpole 2 cm. long and weighing several grams. On chemical examination the animal resulting from this absorption of water will be found to contain less dry matter than the original egg. Growth has utilized water alone in this change, the tadpole being over 99 per cent water. In the human fetus at three months the water content is about 97 per cent, yet all the changes which define external form have taken place and the differentiation of various organs and skeletal structures has been completed.

NATURE AND DEFINITIONS

In dealing with growth of living organisms we cannot think of the process in any sense as one would of the growth of inanimate structures like buildings. Growth does not result from superposition of substances except as new cells are formed by division. The different parts of the growing body are continually changing their relative sizes and the elements which go into the construction of cells are continually being excreted and absorbed. New chemical substances are built up and broken down in the complex life and growth of the organism. Scammon quotes Huxley as saying, "To put the matter in its most general shape, the body_____ is a sort of focus to which certain material particles converge, in which they move for a time, and from which they are expelled in new combinations. The comparison between a whirlpool in a stream and a living being, which has often been drawn, is as just as it is striking. The whirlpool is permanent, but the particles of water which constitute it are constantly changing. Those which enter it on the one side are whirled around and temporarily constitute a part of its individuality; and as they leave it on the other side their places are made good by newcomers." This points out the ever changing constitution of our bodies, but does not simplify the growth problem.

Satisfactory definitions of growth are difficult to formulate. Anatomically it has been said to consist of an increase either in the size of, or in the number of cells in a living body. This definition must include the assumption that qualitative and quantitative changes in function accompany the anatomical ones.

Chemically, growth has been defined as the transformation of foodstuffs, salts, fats, carbohydrates, proteins, etc., and water, into new chemical entities which form the organized protoplasm of living tissues. To my mind it is hard to see how this definition of growth differs greatly from that of life itself. Moreover, these definitions do not include the idea of growing old. And if Professor Child[9] is right in the interpretation of his flatworm experiments, we must broaden our definition to include the concepts of growing small and of growing young.

In this most interesting biologic experiment, Child found that by dietary restriction in growing flatworms he could actually make the animals become smaller, after which, reinstitution of full diets led to increased size. Furthermore, he devised a method of measuring biologic age in the worms based on their reaction to poisons of various sorts, and was able to demonstrate that the worms which were decreasing in size were biologically younger than those increasing in size. He contends that the decrease in size was not due to shrinkage from lack of nourishment, but was a true growth change. Since the processes here involved were reversible, by repeatedly changing the dietary regime of his animals, he was able to continue the process on

the same individuals, changing them from bigger and older to younger and smaller, thus making their life span of any duration he pleased, subject only to the limitations of the experiment and accidental death of the worms.

In this article, growth will be considered to be the sum total of the physical and chemical processes which bring about increment in form and function in living tissues. Function is included in the definition because I cannot see how form and funeton can be separated in considering living beings.

COMPLICATING FACTORS IN STUDY

Before we can begin to discuss growth processes the existence of complicating factors must be taken into account. Growth of cells in the first stages of the embryo and in tissue cultures is relatively simple as compared with growth after differentiation has begun.

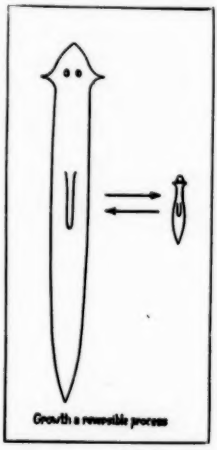

Fig. 1.—Growth, a reversible process (Brody's modification of Child's figure), from *Growth*, 1928, New Haven, Conn. Yale Univ. Press.

Since under optimal conditions tissue culture cells may be made to double their weight every twenty-four hours, a rate of growth far greater than any seen in extrauterine life, it is evident that any computations of growth rate based on this type of investigation will have to be greatly modified by other factors.

As soon as the beginning of organ formation is evident the various cells of the embryo are no longer equally nourished, nor are they equal with respect to their external environment. The blood supply and oxygenation of some will become better than that of others. Some cells will develop into tissues which grow relatively faster than others from causes beyond our knowledge. For this reason alone it would seem probable that no simple law of growth is likely to develop. The observation brings into relief one important fact, however, that differentiation of tissues always retards the rate of growth.

Another factor which complicates the study of animal growth is the presence of hormones which exert both general and specific effects upon tissue growth. Hormones complicate the problem both from

the standpoint of type and rate of growth. At puberty the development of the sexual apparatus and musculature is tremendously stimulated by gonadal and hypophyseal activity. In certain conditions lack of, or oversupply of thyroid secretion markedly changes the type and rate of growth. Pituitary dysfunction may stimulate or retard bone growth as may parathyroid disturbances. In fact, none of the known hormones can be ignored in any consideration of growth.

Our problem is further complicated by nutritional conditions, both in the older, quantitative sense and in its newer, qualitative one. Growth of people living under starvation conditions is retarded and changed qualitatively. Experimentally and clinically growth has been accelerated, retarded, and abolished by changes in the administration of accessory food factors, vitamins, amino-acids and salts. Moreover, as in the case of the hormones, we find that certain types of growth are changed specifically by specific factors. The elimination of vitamin A results in the growth of squamous epithelium in the pharynx and renal passages, deficiency of vitamin E results in atrophy of the seminal epithelium, etc. We must list all of the known vitamins as being necessary for and complicating the picture of normal growth. Of the amino-acids,[44] lysine, tryptophane, cystine, and histidine are proved necessities for growth and while the others are not absolutely necessary, they are probably of minor value in the process.

It is probable that the indispensable amino-acids are used as building stones—that they furnish complex molecules in the absence of which the body is unable to synthesize necessary compounds for the maintenance of life. The exact nature of the rôle which the vitamins play is a matter of debate and is likely to remain so until their chemical constitution is known. It is possible that their action is similar to that of ferments or of hormones.

Recent experiments[44] have demonstrated that certain amounts of some of the mineral salts such as iron are necessary for growth. Growth cannot proceed without sodium and potassium, but goes on fairly well if one or the other is supplied in small amounts. Calcium, as is well known, is necessary in relatively small amounts for bone growth. These mineral substances are undoubtedly necessary as building stones in the growth process and in a broad sense, of course, all of them are necessary.

Light may stimulate or retard growth, hence complicates the experimental approach. Heat up to a certain point accelerates its rate, above that, retards it. Recently various chemical substances have been suggested as stimulating or retarding the process. Hammett[20] maintains that growth by cell division is retarded by the Pb ion and that it is accelerated principally by the sulphydryl group. Of course, oxygen is necessary for most animate growth, and other gases modify it. Heredity exerts a profound effect on the rate and quality of growth and is a particularly complex factor in that of human beings. This influence is most marked and hardest to explain in the hereditary forms of dwarfism where only certain individuals in a family show the defect. Of course, heredity is often the most important factor in determining specific differences in growth, the relative size of parts of the body, facial characteristics, etc.

The rate of growth is influenced further by the season of the year as shown by the work of Nylin[27] in Sweden and others. Maximum

rates of growth appear during the fall and early winter months and minimum rates in the summer.

Many diseases tend to retard growth, congenital heart disease, nephritis, diabetes, syphilis, and some of the central nervous system affections. Acute infectious diseases commonly interrupt the course of growth but do not usually affect its ultimate attainment.

It is possible that to these already numerous complicating factors in the growth problem we should add socio-economic factors aside from the quantity of food, and leave a large space for factors which are as yet unknown.

GROWTH FORMULAS AND THEIR PURPOSE

In view of all this it is a remarkable fact that there should have grown up a voluminous literature on the subject of growth formulas. To the medical man unacquainted with the intricacies of algebraic curves and only slightly conversant with statistical methods, the multiplicity of complicating factors in the growth problem would seem to make impossible the establishment of growth formulas of practical importance. However, it is evident that by methods of control and group observations many of these variables can be eliminated or averaged out and great effort has been made to express growth curves algebraically. The weight and stature curves of all animals and plants show such marked similarity that it is necessary to make an attempt at summary of this work.

Parenthetically it should be stated that this search for an algebraic expression of growth has a very definite and practical purpose not at first apparent to the medical practitioner. If the biologists were able to agree on a growth rate expression which was generally applicable to all living things, valuable deductions might be made from this as to the nature of the growth process and possibly indeed, as to that of life itself. It was in this manner, for instance, that the relationship of the tides to the force of gravity was established. When it was found that the algebraic expression for tidal movement coincided with that which expressed Newton's law it became possible to assume that the tides moved under the influence of this force.

AUTOCATALYTIC THEORY

Study along this line received great impetus when Robertson[34] and Ostwald,[28] announced their autocatalytic chemical reaction theory practically simultaneously. They observed that growth in animals did not occur at a uniform velocity throughout life and that the curve did not proceed at an increasing velocity to a peak and then gradually decline. Rather, it seemed to be composed of three segments each one of which went through a similar cycle, gradual acceleration, peak and retardation. Robertson called these spurts growth cycles. The first growth cycle in man begins with fertilization and ends at about the first year of postnatal life. The second centers about the sixth or seventh year as its peak, and the third is the adolescent spurt. Davenport is equally certain that there are but two cycles in human growth. English and German observers speak of three "springing up"[21] periods, each followed by a "filling out" period. They feel that skeletal growth precedes muscular and visceral growth in each of these three cycles. Whether or not we accept Robertson's cycles as a true picture of the growth curve, it

seems established that cyclic growth is a characteristic phenomenon in the lives of all plants and animals.

Robertson[33] pointed out the marked similarity between the algebraic expression of the graphs of growth cycles and those of certain chemical reactions which are known as autocatalytic, and reasoned from this similarity that growth itself was an autocatalytic chemical reaction taking place in the body. Examples of known chemical processes of this type are found in the decomposition of cane sugar in boiling water, the decomposition of castor oil in the pulverized seeds of the bean, the oxidation of most metals and a variety of chemical substances. These reactions are all characterized by the fact that one of the products of the chemical change has the ability to accelerate or catalyze the further progress of the reaction. In the case of the hydrolysis of cane sugar by water, a certain proportion of mucic acid is formed which accelerates the conversion of cane into invert

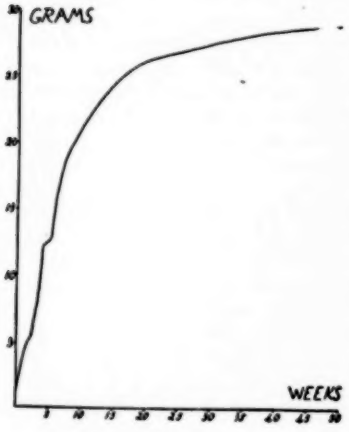

Fig. 2.

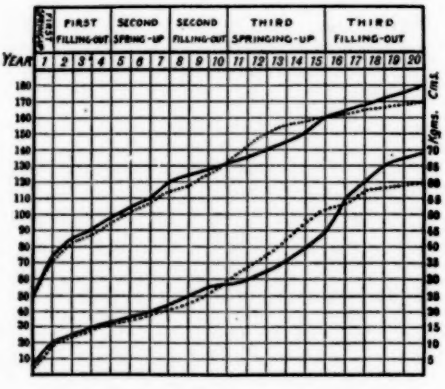
FIRST FILLING-OUT
SECOND SPRING-UP
SECOND FILLING-OUT
THIRD SPRINGING-UP
THIRD FILLING-OUT
YEAR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Kgms. Cms.

Fig. 3.

Fig. 2.—Graph representing three growth cycles (Robertson),.from Abt's *Pediatrics*, Philadelphia, 1923, W. B. Saunder's Company, Vol. I.

Fig. 3.—Growth curves for height and weight showing three springing-up periods followed by three filling-out periods. (After *Stratz Der Korper des Kindes und Seine Pflege*, Stuttgart.) Boys continuous line; girls, dotted line.

sugar, in the oxidations peroxides are formed which act as carriers of the oxygen to the yet unoxidized parts of the substance. In this type of process the fact that the reaction has once begun favors and accelerates its progress. Hormones were suggested as probable active agents in the acceleration.

In many ways this sort of behavior is similar to that of life and growth and it is not surprising that these observers tried to make the analogy. When it was shown that many different growth rates take place at the same time in various tissues of the body, Robertson hypothecated a master or control autocatalytic reaction governing general growth.

The hypothesis that a growth accelerating substance was formed in the first part of the growth cycle made it necessary to assume that in the latter part, when the rate was retarded, an inhibitory

substance was active. This was necessary because in the chemical examples cited, cessation of the process comes about through exhaustion of raw materials, whereas in living tissue such is not usually the case. In support of this hypothesis various observers have been able to demonstrate growth inhibitory substances which, like the growth accelerators, are apparently products of growth itself. Carrel[8] and his workers showed that cells in tissue culture could be made to grow at their maximum rate only when they were continually irrigated with the nutrient materials so that the products of growth could not accumulate. McKendrick and Pai[25] showed that in the case of bacteria growing on a limited amount of culture material, growth phenomena were strictly analagous to those in highly developed organisms as far as rates were concerned. Increase occurred very slowly at first, rose more and more rapidly to a peak, then declined as the population became more crowded and finally came to a stop, due to lack of nutritive material. His experiments pointed to the presence of accelerator substances resulting from growth, but did not throw light on inhibitory factors. Robertson himself provided evidence of the presence of inhibitory substances when he found that infusoria incubated in used culture material which had been filtered and enriched with nutrient substances grew at a rate far below that found in fresh material.

The question of the presence of growth accelerating and inhibiting substances probably has its clinical significance in the processes of wound healing and growth of tumors. Robertson would explain that the rapid repair following lacerations was dependent upon loss of growth inhibitory substances which were poured out of the tissues with the injury. In their absence repair, new growth of cells, is allowed to begin immediately. It is a well-known theory of malignancy that for some reason the cells of the tumor take on an embryonal character and therefore the growth rate of embryonal cells. It is not inconceivable that the ultimate answer to this problem will lie in a method of producing growth inhibitory substances in the body sufficient to check this embryonal spree.

It may be well to recapitulate the theory of Robertson and Ostwald because it has been a storm center among the biologists. In this conception growth in animals and plants proceeds in a series of cycles, each one of which represents an autocatalytic chemical reaction in which at first products of growth itself accelerate the rate, and later on other products inhibit the rate leading to temporary or permanent reduction in growth. This conception has been questioned on various grounds. Some observers deny the presence or dispute the number of growth cycles. Others show that graphically the smooth, symmetrical curve of an autocatalytic reaction is not identical with that of growth cycles which are always asymmetric. While this theory has not been accepted by all, it still holds the center of the stage.

If growth is stimulated by chemical substances identical with or similar to catalyzers it is interesting to speculate as to their nature and origin. One's attention at once turns to the hormones because of the general and specific effects of the endocrine system on growth. Engelbach[19] has recently reported the case of an ateliotic dwarf who was made to grow normally during the administration of Evan's pituitary hormone. This Engelbach calls "*the* growth hormone."

Amino-acids and vitamines must also be considered as possible chemical catalyzing agents.

While Robertson finds three growth cycles, Brody[7] prefers to divide the life span into seven more or less arbitrary periods after Shakespeare: First, embryonic, fertilization of the ovum to the end of the third month; second, fetal, third month to birth; third, infantile, up to two years of age; fourth, juvenile, up to about twelve years; fifth, the adolescent period; sixth, mid-life, twenty-five to sixty years; and seventh, old age, from sixty on to death. Brody seems to feel that there are several periods during accelerated early growth which have different but constant rates of increment, but that in the later inhibitory phase the chemical explanation of growth is true.

CAUSES OF CELL DIVISION

Many observers point to acceleration of growth as the result of the tendency of cells to divide. This activity is explained on the basis that cell division results from an attempt on the part of the cells to reach chemical equilibrium with their environment. The young cells,

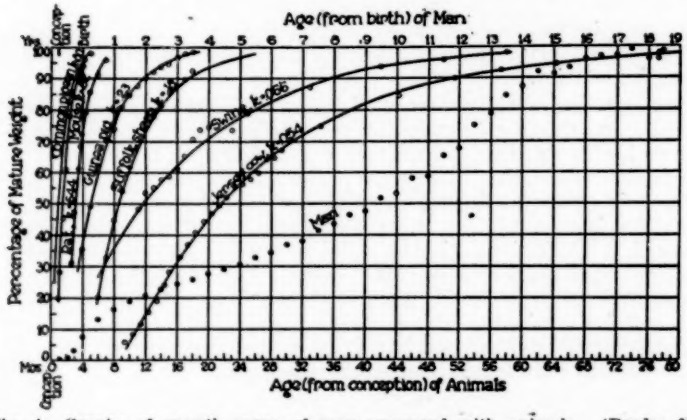

Fig. 4.—Graphs of growth curve of man compared with animals. (Brody, from *Univ. of Missouri College of Agriculture Research Bull.* No. 101.) Illustrating the difference between the human curve and that of animals. Weights are charted here as percentages of ultimate achievement.

unstable with respect to environment, enlarge, then becoming unstable with respect to themselves, divide, each new generation repeating the process. It has also been held that cell division takes place when the relation of mass to surface area becomes so large that nutrition is interfered with, also that it is a function of the nucleoprotoplasmic ration, growth rate decreasing with relative reduction of nuclear substance.

Brody explains the comparatively constant rate of growth seen in very early life as due to the fact that conditions are relatively stable at this time, environment and differentiation playing a less important rôle here. These factors plus hormonal activities explain later irregularities.

LAWS OF GROWTH

Backman,[2, 3] in reviewing the entire field of growth formulas lays down the following postulates which any correct biologic curve of

growth must fulfil: First, it must begin at "origo"; second, at the beginning it must proceed convex toward the abscissa and later concave, so that there is an inflection somewhere, i.e., the curve must be S-shaped; and third, it must approach an end point asymptotically. Backman reasons that the formula for compound interest may be used as a basis for computation of growth with the understanding that the rate is inconstant, a function of time. He claims that the formulas resulting and their interpretation agree with the results of Carrel and represent truly the course of growth. According to his theory the acceleration and the retardation are proportional to the time logarithm and to its square. In particular cases the acceleration or retardation may predominate by the logarithm of time, or either one by the

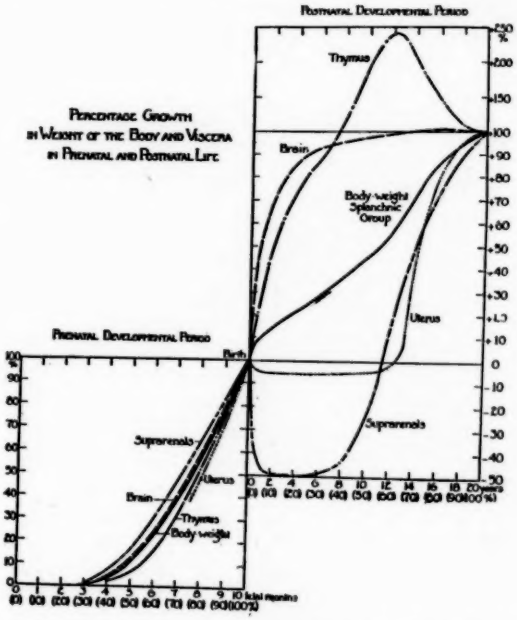

Fig. 5.—Percentage growth of the body and viscera. (Scammon, from *Growth*, 1928, New Haven, Conn., Yale Univ. Press.) Showing the different growth rates going on simultaneously in the body. Weights charted as percentage of ultimate achievement.

square of the logarithm of time, or, in a certain place, they may neutralize one another. In his study he shows that three of the nine theoretically possible situations are realized in nature.

He recognizes two large types of growth, one which proceeds without limit even though the rate decreases with time, asymptotic growth, and another which reaches a definite limit in finite time, terminal growth. The first is illustrated by trees, plants, and some lower animals, including fish. The second is the type seen in higher animals but also in some plants. The occurrence of growth cycles is admitted to complicate these two main types but the term "grosse Periode" (Sachs), is preferred. Backman feels that their presence merely com-

plicates the basic formulas for growth and that they must be computed into such formulas in order to find the total relative growth rate.

In the recent articles by Backman various formulas for growth by Robertson, Brody, Baule, Putter, Anderson and Fischer, Pearl and Reed, Hoesslin, Donaldson, Deschamps and Teissiers, Bastien, and Schmalhausen are critically reviewed,[1] but detailed discussion of these cannot be attempted here. It may be mentioned that in reading growth formulas and graphs, close attention must be paid to their manner of construction. Some represent increments in weight or stature as absolute gains, some as percentage of gain over the previous periods measured, some as percentages of the ultimate attained measurement, and others chart attained actual measurements.

The fact that several growth rates are in action at any given moment in the body was emphasized by Scammon[36] and Donaldson.[17] In the chart from the former's work here represented it is seen that

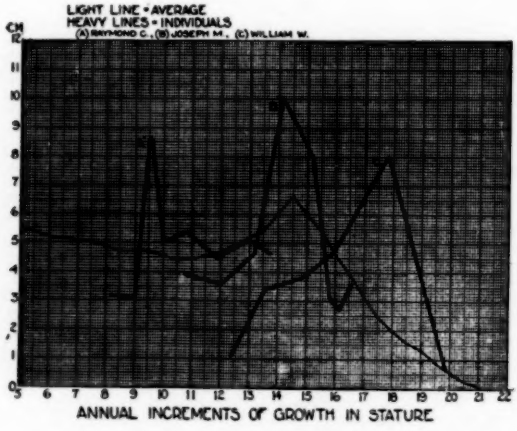

Fig. 6.—Graph of average weight increments compared with those of individuals. (Davenport, from *Proc Am. Philosoph. Soc.* 70: No. 4, 1931.) The curves in a heavy line chart the yearly weight increments of three different boys showing the different ages at which the adolescent spurt occurs and the marked variations from the average curve.

several types of tissue vary markedly in their rate after the time of birth, the general musculature and splanchnic organs, lymphatic system and thymus, brain and nervous system, sexual apparatus, and suprarenal glands all taking on their several and devious pathways. It will be noted that this graph illustrates the method of computation by which increments are plotted as percentages of ultimate attainment as mentioned above. In Scammon's chart the curve of musculature and splanchnic organs, as might be expected, most closely simulates the usual curve shown for body growth.

Davenport[12] in discussing the interpretation of graphs of growth drawn from mass studies, where many individual measurements are averaged to make the curve, has pointed out an extremely important fact, that the mass curves differ radically from individual curves of growth. As seen in Fig. 6 a more or less smooth curve represents the adolescent spurt on the mass curve, whereas in the individual ones

extremely sharp jags result. He feels that it is hard to conceive that any law or principle of growth drawn from the average curve can explain what actually occurs in the individual. Certainly we cannot apply general growth curves strictly to our patients.

In evaluating all these attempts to represent growth mathematically it seems quite fair to agree with Harris[21] that they have failed to give any simple solution because the growth rate at any instant in any child as "a whole is the resultant of a considerable number of different growth rates." And we have seen already how many other complicating external and internal factors enter the problem.

THE BEGINNING OF GROWTH

Turning for a time away from the mathematical attempts to analyze growth it is worth our while to investigate what might be called the cytologic or histologic approach. It would seem that the best and simplest place to study the nature of growth would be at the very beginning, where complications would be fewer. One is at once faced with the problem of when life begins. At first thought it might be said that fertilization of the ovum marks the beginning of life and growth. Yet, when we inquire into the growth process we find that before fertilization, profound changes have taken place in both the egg and the sperm. During the process of maturation, reduction of chromosomes has taken place along with morphologic changes in the cells. Certainly no such important factor in the orderly growth program can be left entirely out of the picture. If growth begins before fertilization, why not before maturation in the development of the ova and sperms themselves? This merely serves to point out the immortality of the cells which carry on life. Fertilization seems to be merely a punctuation point in the stream of life, one of its landmarks.

ORGANISMIC PATTERN

Moreover, in following through the processes leading from development of the germ cells and maturation to fertilization, one is impressed with the fact that a plan is being carried out with infinite precision. This realization of protoplasmic planning is, according to Child,[10] fundamental in any consideration of growth. It is conceived that cells develop according to the nature of the protoplasm of which they are formed. This is called organismic pattern, and it is believed that the cells in each species develop according to their specific pattern, markedly influenced, however, by environment which determines and modifies the developing plan.

While the idea of organismic pattern has an indefinite, teleologic sound, an illustration from inanimate states is given by Robbins[32] to show that it has a counterpart there. He points out that the ordinary "snake's nest" or Pharaoh's serpent firework is an example of a chemical reaction which develops a definite structural pattern. If we set fire to the tip of a cone of mercury sulphocyanate the oxidation product will be a snake a hundred or more times the size of the cone. This is particularly pat as an illustration because the reaction is specific. Not only is mercury sulphocyanate the only chemical substance which will do this, but oxidation alone reacts in this manner and the substance must be moulded into a cone and the fire must be applied at the tip. Environment also is important in determining the direction of organismic pattern in this illustration.

The plan of growth is tremendously stimulated by fertilization. Rapid cell division and cleavage begin immediately forming masses of cells which pile up in the familiar formations of the developing embryo, morula, blastocyst, etc. The next step after cell division is the beginning of that process which has always been the subject of so much speculation, differentiation. This consists in the assumption by certain cells of specific characteristics, and eventually in the formation of many organs and tissues functionally interdependent in the body. While we do not know the force that brings about this differentiation it is possible to review some of the theories regarding it.

THEORIES REGARDING DEVELOPMENT

Originally life and growth were considered as vital, purposeful forces, mysterious in nature and surrounded with all sorts of superstition and lore of mysticism. Out of this confusion have come several theories which, while they do not finally answer all our questions, do give us a clearer vision and shed the light of experimental method on the problems.

Under the leadership of Darwin, Spencer, DeVries, and Weismann,[11] a morphologic theory of development grew up. Gemmules, genes, physiologic units, pangenes, or determinants are various names which were given to specific parts of chromosomes which were supposed to be the structural bases for heredity and development. In this conception the germ cell is thought of "as a colony of units capable of reproduction," each one of the units growing into its own particular part of the body. While this idea has been widely accepted, more recent experiments on developing embryos throw doubt upon its soundness. I refer to the group of experiments originated by Driesch in which it was shown that if the developing early embryo was bisected with a knife, two complete individuals might result instead of one or two monstrosities as would have to follow if the previously outlined theory were strictly true.

Later, Driesch[18] hypothecated a constructive, unifying force which he called entelechy as that which controlled and shaped the growing organism. Child points out that it is absolutely necessary to hypothecate this or some other unifying force if one accepts the Weismann theory of morphologic units, because something would have to keep the various developing parts from growing wild at each other's expense.

Verworn[42] stated the first chemical hypothesis. This conceived the biogene, a complex, labile proteid molecule, as the producer of life. He felt that "life consists in chemical change rather than in chemical constitution," and that life was made possible by the extreme lability of this biogene. His theory does not account for growth and differentiation, but it is interesting in that it leads up to other chemical theories which attempt to do so.

Höber[22] conceived of living protoplasm as a colloid product of the reaction of definite chemical substances, *and* as a substratum in which these reactions take place. The substrate not only forms the environment for the reactions, but influences their nature chemically and physically.

Bechhold[6] says that life is inconceivable except in a colloid medium as this chemicophysical state alone permits the formation of morphology, membranes, etc., and forms the basis for our understanding of

water absorption and secretion as well as of salt metabolism and enzyme activity.

Child,[10] commenting on these theories says, "a living organism is a specific complex of dynamic changes occurring in a specific colloid substratum which is itself a product of such changes, and which influences their course and character and is altered by them." Thus life is neither a chemical reaction nor a colloid substratum, but is the product of the two. Roux compared life to a flame, Child to a stream. In the latter analogy, the flow of the water is the chemical energy flowing through the organism. The banks and bed are the morphologic features. Both are associated from the beginning and are indispensable to one another. Structure and function must supplement each other in order for life to exist.

EFFECTS OF ENVIRONMENT IN DIFFERENTIATION

Child would say that growth was the result of the working out of organismic patterns of living protoplasm as modified by the environment of the cells. And it is partly as a result of his emphasis on environment as a factor in growth that we can get some idea of the beginning of differentiation of cells and tissues. His views are not so predeterministic as are the ones outlined above. He believes that the constitution and behavior of the fully developed organism are the result of the interplay between specific hereditary properties of the germ protoplasm and environmental forces exerted upon it. The protoplasm of the ameba displays certain reactions to its environment while that of the starfish, plants, and human beings have different reactions. This he considers is heredity. Reactions in older individuals are determined by previous experience leading to individual variations and individually acquired characteristics. But the hereditary type of behavior is more stable in character since it is inherent in the protoplasm. In the specificity of different protoplasmic reactions to environment, Child sees the development of differentiation.

For instance, the fact that a cell in the morula is located on the external surface of the embryo makes its environment different from that of cells on the interior. These external cells are more subject to environmental effects and may be expected to react in a different manner, thus making them changed cells. This is the beginning of functional and morphologic change, differentiation. Moreover, specific environmental effects to specific parts of the external layer of cells may determine the location of the axis of growth, the place at which the head begins.

This recognition of environmental function in differentiation seems to be important because without it we are forced to fall back upon mystical explanations of the phenomena of development. It makes it possible to get away from the idea that a vital force is consciously working to unfold the parts of the organism packed somehow in the chromosomes. The force of environment in development is further demonstrated by Child to affect the internal as well as the external cells. This is brought about by the fact that the various cells are interdependent from the standpoint of transfer of nutriment and energy, of both mechanical and excitatory nature. The cells which are in contact with nutriment become the means of conveying it to others less favorably located, and the ones exposed to stimuli of various sorts impart these to others not in direct contact. Thus we may see an envi-

ronmental impulse to the development of the alimentary and nervous systems.

GRADIENTS

In this connection, the subject of gradients is one intimately tied up with growth. The conception of physiologic or developmental gradients is easily explained as the result of environmental factors acting on organismic pattern. When, as has been mentioned above, environment determines the location of the development of the head, this region becomes a location of especial reactions which are transmitted in decreasing intensity throughout the embryo. The head point may, therefore, be said to be dominant over the rest of the organism. As a matter of fact this dominance of certain parts over others makes for unity. The brain is dominant over the central nervous system, the heart over the vascular system, etc. In a larger way, perhaps, there is developed in this manner a gross physiologic gradient in that the head end of the developing organism takes precedence over the more caudal regions. Thus the cephalic end has a more rapid early growth giving rise to the cephalocaudal law of growth. Child sees in the exquisite working out of multiple systems of gradients the development of coordination in the central nervous system as well as in the other great systems.

The human being is of the axiate pattern, and in such systems polarity develops and subgradients are formed for the different systems and parts of the body. In plants, which also are of the axiate pattern, the growing tip is dominant over the rest. It is an interesting fact, however, that the rapidity of growth in the tip of plants is apparently due to the presence there of cells of embryonal type which carry on division at a rapid rate. As the mass grows upward the lower cells become more specialized, differentiated (here again note the influence of environment), but the topmost cells remain embryonal in type. It is interesting to speculate on what determines the succession of dominance to one particular limb when the top tip is lopped off by accident or design. However, one of the branches turning its tip to the sky dominates the rest and carried on, its vanguard of embryonal cells dividing and redividing as long as there is life.

Polarity simply determines the axis along which differentations determined by protoplasmic pattern and environmental influences may develop into a unified organism. In this conception any cell in the young embryo may develop into the head, but due to these factors, only the ones properly located can do so.

Recapitulating, the more modern theories of growth and development seem to indicate that due to the process of mitosis and nuclear division, each cell of the early embryo inherits the quality of all of the original germ plasm, that differentiation comes about through the interplay of organismic pattern, external environment, and polarity, and that gradients are important factors in this differentiation. Once the cephalocaudal gradient is established, metabolic changes at different levels appear which lead to qualitative changes in the cells which in turn form the basis for further differentiation and for correlation between cells and forming tissues.

In the foregoing discussion an attempt has been made to summarize a few of the theories which try to explain that part of the growth process called differentiation and unification of the organism, without which nothing more than a jelly-like mass of protoplasm could be

developed by life. Once the integration of tissues has taken place we are faced with the previously discussed curves of growth and their multiple points of significance, differences between pre- and postnatal growth rates, growth cycles, and variations due to other factors. The fact that growth goes on to develop remarkably similar individuals in each species in spite of all these variables serves only to emphasize the overpowering dominance of planning, organismic pattern. The working out of this force in protoplasm is oppressive in its stereotyped repetition, so implacable that the freak or sport in development is relatively rare. This is only another way of stating that nature is decidedly conservative and resists change, possibly explaining one of the dominant traits of human beings. Chained as the race is to this stereotyped method of growth one welcomes opportunities for variation such as are found in the many environmental factors influencing growth.

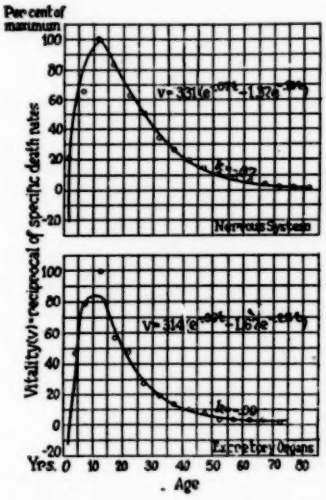

Fig. 7.—Senescence Curves. (Brody, from *Growth*, New Haven, Conn., 1928, Yale Univ. Press.) Rise and decline of vitality with age as measured by reciprocals of mortality due to breakdown of the nervous and excretory systems.

SENESCENCE

Another subject intimately associated with the nature of growth has been that of senescence. Indeed, growth may be described in terms of increasing senescence and senescence as decreasing growth. According to some observers senescence begins in the earliest stage of the embryo when differentiation is first evident, for this process seems to exert a definite, progressive, inhibitory effect on growth.

As usually considered, however, senescence begins in animate life at some time after puberty. In human beings its onset may be dated at between twenty-five and thirty years, after which the physical powers of man wane and growth becomes a factor only in emergencies, to repair damaged or diseased tissues.

Senescence is manifested histologically in a reduced tendency to cell division (new cell construction), and in shrinkage rather than

hypertrophy of the cells already formed. It has a chemical significance in that older cells react differently against poisons and irritants, and this has led to quantitative estimations of senescence in experimental animals. This may explain the variations in reactions of children and adults as illustrated in many pathologic conditions. Moreover, older cells contain relatively less water.

The process of senescence is evidently due to a number of factors inhibitory to growth, in addition to the already mentioned differentiation. Other growth inhibitory factors have been demonstrated by Loeb,[24] Thompson,[40] Robertson[34] and others, the most convincing work being that mentioned in connection with tissue cultures. In terms of the living body this seems to mean that senescence may depend partly upon the accumulation of growth inhibitory products in the body. It has been argued that these substances may be the ones which cause decreased cell division in differentiation since organ formation leads to less simple situations as regard supply of nutriment and removal of waste products. In this theory it is held that the differentiated cells

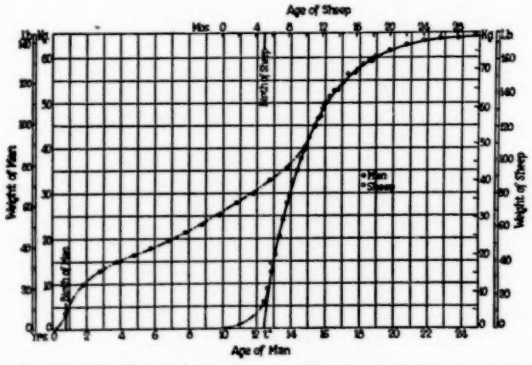

Fig. 8.—Prolonged juvenile period in man. (Brody, from *Univ. of Missouri College of Agriculture Exp. Station Bull.* No. 101.) Note the similarity in curves after beginning of adolescence and the extremely long time it takes the child to reach this stage. Adult weights of sheep and man are approximately equal.

divide less rapidly because the growth inhibitory products of metabolism are less thoroughly irrigated away from them.

It seems to be definitely established by this tissue culture work that cells are potentially immortal and that ageing and cessation of growth are brought about by external factors, at least as far as the individual cells are concerned. The sum total of these inhibitory factors constitutes senescence, a force gradually mounting throughout life, at first barely able to influence growth, balancing it at the end of puberty, and finally dominating the picture of middle life and old age. Curves of senescence have been drawn using as factors, time and death or morbidity rates. These curves show remarkable similarity in the different species of life. If this senescence curve were a simple one it would be expected to show similarities to those drawn to represent growth.

One of the great differences between human growth and that of all plants and other animals is the fact that senescence is markedly delayed during the prolonged relatively slow process of juvenile growth.

As has often been mentioned, it is likely that this is the greatest factor in man's intellectual superiority over the beasts and the birds. In our protracted childhood we have a long period of educatability before our brains begin to "jell," and at the same time during this period we are not unduly taxed by the physical strain of extremely rapid physical growth as in the case of the lower animals.

SUMMARY

We have very briefly enumerated a small part of the sum total of the work and ideas about the nature of growth. In trying to gather up the loose ends in a survey on so controversial a subject, one has to be extremely guarded since very little is generally accepted fact. It is conceived by many, however, that growth consists of two large processes, cell division, and differentiation. These have their expression in the two great properties of life, morphology and function.

The cause for cell division is intimately tied up with the problem of life and is therefore a physicochemical one possibly due to an attempt on the part of cells to reach chemical and physical equilibrium both with respect to their internal economy and to their environment. It is agreed that cells are potentially immortal in their innate ability to go on dividing ad infinitum and that the reason for cessation of growth and its coincident senescence lies in the production of growth inhibiting substances during the life process. Differentiation itself has an inhibitory effect on the rate of growth, but this may be due to the fact that differentiation permits accumulation of the inhibitory products of metabolism.

Differentiation, the process in development which makes variation in function possible, is the result of protoplasmic or organismic pattern, heredity, supplemented by the effects of environment, according to some biologists.

Study of growth rates, while demonstrating marked similarities between different animals and even plants, has been complicated by so many variables in its computation that up to the present time no undisputed law of growth can be stated. The factors complicating the problem are, individual variation; different growth rates in the various parts and organs of the body; nutritional factors such as amount of food, vitamins, amino-acids, and mineral salts; endocrine factors; heredity; environmental influences such as temperature, sunshine, atmosphere, season of the year and socio-economic status; and disease processes. Whether the growth rate will be proved to be dependent on the law of compound interest, on that of populations, or on that of an autocatalyzed chemical reaction, or upon some other natural law is for the future to decide.

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American Academy of Pediatrics

Proceedings

SECOND ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

FRIDAY AFTERNOON SESSION
May 13, 1932

Round Table Conference on Respiratory Infection

Leader: Dr. Isaac A. Abt; Assistants: Dr. H. R. Casparis and Dr. L. R. DeBuys.

Round Table Conference on Pneumonia, Pathology and Symptomatology

Dr. Isaac A. Abt

PNEUMONIA

In presenting the aspects of the symptomatology and pathology of pneumonia in young life I shall present a review of the recent progress in clinical and pathologic contributions which have been collected from numerous sources.

Pneumonia is one of the most frequent diseases of infancy and presents a series of unsolved problems. Bronchopneumonia is most frequently encountered during early life. It occurs from the sixth month and reaches its maximum at the end of the first or second year and tends to become less frequent at the fifth or sixth year.

Lobar pneumonia is relatively rare before the second year, though it may occur with greater frequency than has been supposed. McNeil, MacGregor, and W. Alexander[1] state that lobar pneumonia is supposed to be rare because it is comparatively seldom seen in the postmortem room of the Children's Hospital. In uncomplicated cases the mortality is low. The statistics of 945 autopsies of all deaths from all causes at the Royal Edinburgh Hospital for Sick Children in 1922 to 1928 showed that 2.5 per cent were lobar pneumonia and 14.8 per cent were bronchopneumonia. The age distribution of lobar pneumonia varied from four months to four years. More than three-fourths of all the cases of pneumonia occurred in children under two years of age.

St. Engel is also of the opinion that lobar pneumonias during the first year are not as infrequent as has been supposed. He believes that this view is supported by the course of the disease, the critical termination of the fever and the x-ray examination.

Before the sixth month of life, the secondary pneumonias are of most frequent occurrence. They result after a previous nutritional or alimentary disturbance and are preceded by congestive processes in the lung. During the first month of life the aspiration pneumonias are comparatively of frequent occurrence, as has been shown

[1]Arch. Dis. Child. 4: 83, 1929.

by the investigations of Loeschke, Ribadeau-Dumas[2] and others. A pneumonia may originate primarily as the result of aspiration; eventually infection may take place and the clinical manifestations may be similar to those which occur in infectious pneumonia.

The question why infants are more frequently attacked by bronchopneumonia than lobar pneumonia has been studied by Lauche. He believes that lobar pneumonia may develop in infants who have been sensitized to the protein of the pneumococcus. He is of the opinion, that those infants may fall ill with croupous pneumonia, who have recovered from one or more mild pneumococcic infections and in this way have been sensitized. In support of this hypothesis, Lauche[3] studied nine cases of croupous pneumonia in the newborn and found that all of the mothers had been ill during their pregnancy with croupous pneumonia. He concludes therefore, that the hyperergic reaction was transmitted from mother to child through the placenta.

PATHOLOGY OF PNEUMONIA IN CHILDREN

Paul Heim and G. Eros[4] believe that many of the older problems in the pathology of the pneumonias of childhood require revision and continued study. They employed the serial frozen-section method of Christeller in their investigation. The sections thus obtained were studied macroscopically, topographically, and microscopically. The macroscopic study of the pneumonic lungs was not altogether satisfactory. Moderately diffuse areas of infiltration sometimes passed unobserved, and atelectatic areas were mistaken for pneumonic infiltrations. By the Christeller method serial sections of the entire lung were obtained and at the same time the relations of the hilus lymph nodes could be observed. In this way it was possible to study inflammatory infiltration of the lungs in the primary stage, as well as in the well-developed, more advanced stage of pneumonia. All cases examined belonged to the bronchopneumonic type, although they were due to different etiologic factors. The exudate was serocellular. It was not possible for the authors to demonstrate fibrin. In many cases, particularly in young infants, it was found that the lung tissue in the inflamed area was atelectatic and the contracted alveoli were filled with an exudate which was serous and poor in cells and contained very few desquamated and alveolar epithelial cells.

The cells in the inflammatory areas consisted for the most part of leucocytes, lymphocytes and plasma cells. Frequently the exudate contains erythrocytes, giving it a hemorrhagic appearance. This occurs characteristically in the influenzal pneumonias of young infants. In infancy as well as later in life, the etiology as well as the morphology of the pneumonic lesions is not uniform.

The pathologic processes which occur in the lung are dependent on a number of antecedent conditions which may be enumerated as follows:

1. The aspiration pneumonias which are more frequent and important in early infancy than has been supposed hitherto.

2. Those pneumonias which complicate the nutritional or alimentary disturbances, and which are supposed to be due in the first instance to congestive processes and are designated by Engel as dystelectatic pneumonias. They may be observed at autopsy in practically every infant dying from a severe nutritional disturbance.

3. The septic pneumonias are associated with general pyogenic infections and show a tendency to abscess formation; they show pleural, fibrinous exudate, and frequently a collection of pus in the pleural cavity.

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[2]Meyer, et al.: Arch. Med. Chir. de l'appar. respirat. 2: 2, 1925.
[3]Lauche: Verhandl. d. Deutsch. path. Gesellsch. Danzig, 1927.
[4]Arch. f. Kinderh. 87: 16, 1929.

4. The pneumonias following the acute infectious diseases of infancy such as pertussis, measles, and diphtheria, are for the most part disseminated or interstitial pneumonias.

5. The pneumonias following severe catarrh of the upper respiratory passages or the so-called grippal pneumonias.

In the grippal pneumonias there are as a rule minute inflammatory changes both in the upper and lower lobes, which are not apparent on macroscopic examination. If the inflammatory foci have coalesced into larger areas they are visible to the naked eye in the Christeller sections.

The dystelectatic pneumonias, according to Engel occur chiefly in the right upper lobe, and spread downward and anteriorly. They are less common on the left side, though when they do occur, they appear in the middle of the lower lobe. In grippal pneumonias extensive involvement of the left upper lobe is exceptional. Also in croupous pneumonia where a single lobe is involved the localization in the left upper lobe is a rarity. Engel attempts to explain this on the basis of the topography of the hilus lymph nodes. The regional lymph nodes lie very close to the right lung and indeed, are almost imbedded in its substance whereas in the left lung they only come in contact with the lower lobe and are situated completely outside of the lung. According to Engel the infection in croupous pneumonia progresses along the lymphatic paths, and this does not depend upon the atrium of infection.

For this reason those lobes of the lung are affected by croupous pneumonia which lie in close proximity to the hilus region which contains the largest number of lymph nodes. While this hypothesis of Engel applies to croupous pneumonia, probably a similar condition exists in the occurrence of grippal pneumonia of infants. This is assumed on account of the localization of this latter type of pneumonia. It will be recalled that the favorite localization of grippal pneumonias is in the left lower and both lobes of the right lung. The left upper is seldom involved.

It has been assumed in times past that the development of bronchopneumonia occurs as a descending infection through the bronchi; namely that a continuous path of inflammation extends along the endobronchial tract to the alveoli. Lauche has maintained that while this may be true in some instances, from his studies he thinks that the inflammation extends only to the terminal bronchi. In the ductus alveolaris this inflammation ceases abruptly. From this point according to Lauche the inflammation extends by the peribronchial route to the adjacent alveoli.

Engel[5] and other authors question entirely the bronchogenic origin of infantile bronchopneumonia. There are cases of severe bronchitis and bronchiolitis which neither clinically nor on autopsy show a demonstrable infiltration of the lung.

On the other hand, there are cases with upper respiratory infection mild in character with practically no demonstrable bronchitis which develop pneumonia. In nearly every case of pneumonia there is a marked swelling of the corresponding lymph nodes. It has been demonstrated in some instances that the inflammation seems to originate in the lymph nodes of the hilus and extends in fan-shaped figures, especially posteriorly and toward the base of the lung. At the onset of a pneumonia the pulmonary infiltration is found to occur about the enlarged hilus glands. This would seem to indicate that the inflammation extends from the hilus.

As the pneumonia progresses into the lung tissue, we find the infiltration encircling the bronchi and vessels. When the inflammatory area has coalesced the perivascular and peribronchial inflammation can no longer be distinguished.

[5]Engel: Deutsche Gesellsch. f. Kinderh. Hamburg, 1928.

In the frozen sections according to the Christeller method, it is readily recognized that the inflammatory infiltration extends along the blood vessels and the bronchi. Even if this definite connection between hilus and lung inflammation cannot always be established, nevertheless, the perivascular and peribronchial cellular infiltration in lung tissue can be made out in every case. This may be recognized even with the naked eye, particularly in cases of grippal pneumonia.

Loeschke[6] assumes that the pneumonic infections in children progress along the bronchial tree to the ultimate alveoli. He thinks that the narrow bronchi are obstructed by minimal amounts of mucus, causing collapse of the alveoli and increasing the tension in the neighboring tissue. Or there may be an infection in the preterminal and terminal bronchi, spreading to the alveoli and producing a focus of pneumonia. Thus he believes that the bronchopneumonia originates in the terminal bronchioles and alveoli. He explains the extension of the pneumonic process by assuming that the alveolar septa contain stomata and the interlobular septa are fenestrated. This would permit the extension of infection to neighboring lung tissue.

The existence of these stomata or openings is still not conclusively proved and consequently this explanation cannot be fully accepted.[7]

The infection of the hilus glands we may assume, occurs in two ways. First along the bronchi or through the blood stream. The microorganisms thus introduced cause the production of a primary focus of inflammation in the parenchyma of the lung. From this primary focus the inflammation is transmitted to the lymph nodes, where the bacteria multiply rapidly and are carried by the lymph-stream into the lung tissue.

Jahr and Hirsch[8] were enabled through a series of Roentgen examinations to determine that before the occurrence of a pneumonia in the infant, during the stage of rhinitis and bronchitis, the hilus lymph nodes became swollen, most often on the right side. Several days before the onset of the pneumonia it could be shown that there was a small circumscribed infiltration about the hilus lymph nodes; or in some cases a triangular shadow, the base of which rested on the diaphragm and the apex was hidden or merged in the circumscribed infiltration about the hilus. In some instances, according to the observations of these authors, the swelling remained confined to the lymph nodes of the hilus, and the inflammation was restricted to the upper respiratory passages. In other cases the lymph nodes are not able to restrain the advance of the infection and the bacteria enter the lymph vessels producing pneumonic foci. As attractive as this theory appears it is difficult to stretch the imagination sufficiently to reconcile the hypothesis with anatomic and physiologic realities. If the infection proceeds from the hilus lymph nodes, through the lymphatics, we must assume a retrograde flow of lymph. This seems an almost insurmountable obstacle in explaining this mode of infection.

It was suggested by A. C. Ivy[9] that Engle's theory could not be explained on the basis of simple reflux. He pointed out that under normal conditions the lymph flows only one way, toward the lymph nodes. He thought it possible, however, that enlarged lymph nodes might produce lymphatic stasis and thus favor inflammation in the pulmonary tissues. He also thought that it was possible to conceive that varicosities and dilatations of lymph vessels might interfere with the normal function

[6]Monatschr. f. Kinderh. 4: 1-6, 1928.
[7]Maximow-Bloom: Text of Histology, 1930. W. B. Saunders Co.
[8]Jahr and Hirsch: Ztschr. f. Kinderh. 46: 611-647, 1928.
[9]A. C. Ivy, Prof. Physiology, Northwestern University. (Personal Communication.)

of the valves in the lymphatic channels and in this way, permit overflow or reflux from the lymph sinuses and nodes into the pulmonary lymph ducts.

W. G. MaCallum[10] offers a pointed explanation of the matter under consideration. Writing of the bronchial wall in pneumonia, he says: "It is greatly thickened and densely infiltrated with mononuclear cells. It appears like a richly vascular granulation tissue containing new blood vessels and that streptococci are not found in the substance of the bronchial walls or alveolar wall nor even in the exudate of the alveoli. They are present, however, in abundance in the lymphatic canals which run in the bronchial walls, and are entangled in a thrombus mass. These thrombosed lymphatics extend throughout the lung and communicate on one hand with the sinuses of the hilus lymph nodes, or with the lymphatic network of the pleura." This explains how the infection may extend from the bronchi through the pleura. This is against the natural current of the lymph, but the organisms extend by growing along the obstructed lymphatic canal. Perhaps a similar explanation may be invoked to explain the extension of organisms from the hilus gland to the parenchyma of the lung.

It may also be noted that the lymph does not flow constantly in the lymph vessels, but it may be conceived that under the influence of respiration the ebb and flow carry microorganisms from the hilus to the lung. It has also been pointed out that the valvular structures in the lymph vessels of the lung are poorly developed so as to make a reflux of lymph possible.[11] The failure of valves to develop in the lymphatics of the lung, is not conceded by all.

Blake and Cecil[12] experimented with virulent cultures of pneumococci and found that lobar pneumonia could be produced in monkeys by injection of minute quantities of the culture into the trachea. In their experiments on lobar pneumonia in monkeys, they found that the infection seemed to begin at the hilum and extend radially through the tissue by way of the lymphatics.

It is evident that there are a number of plausible theories to support the view that the infection extends from the hilus glands to the parenchyma of the lung.

PNEUMONIA

Pathologic Physiology.—While it is usually considered that pneumonia is a local inflammation of the lung, nevertheless, at the onset as well as at the height of the disease every clinician knows that constitutional symptoms may overshadow those which are of local origin. The most important of the general symptoms are those of the heart and the circulation. The nervous symptoms manifest themselves in the form of delirium, meningeal symptoms, fever, renal changes, gastrointestinal symptoms, enlargement of the liver, icterus, herpes and enlargement of the spleen. These symptoms are probably produced by the toxic products of the invading organism. While the pneumococci are present in the blood, they are very rapidly destroyed in this medium, although they may be lodged in the tissues. On the other hand, there is sufficient evidence that the bacteria may attack various organs producing meningitis, pericarditis, joint affections and general sepsis. The nature of the toxin and its exact effect on the organism is not definitely known nor has the toxin been isolated.

CHEMICAL CONSIDERATIONS

The inflammatory reaction occurring in pneumonia results in the production of an albuminous exudate, therefore, the body is deprived of important protein. The albumin is soon decomposed, causing an increased nitrogen excretion through the

[10]MaCallum, W. G.: The Pathology, J. A. M. A. 71: 704, 1918.
[11]Tendeloo quoted from Nassau.
[12]Cecil and Blake: J. Exper. Med. 31: 657-685.

urine and a negative nitrogen balance. This exudate has been supposed to be dissolved by tryptic ferment according to the researches of Fr. Müller and O. Simon.[13] It has been thought that the end-products of autolysis are leucine, tyrosine, histidine, arginine and lysin. These find their way into the blood stream and are eliminated in the urine as uric acid and urea. Creatin and uric acid are found increased even before the crisis and the nonprotein nitrogen of the blood serum is also increased.

Retention of sodium chloride in pneumonia has been discussed for a long time. The quantity in the urine is markedly diminished. Various explanations have been offered for this retention. Some have maintained that the chloride is held at the site of the inflammation, others have thought that it is due to a renal insufficiency, though Von Monikow thought that there was too little salt in the blood of the pneumonic patient and consequently sufficient salt was prevented from reaching the kidney. It seems that the salt is held in the tissues, though where it is deposited is unknown. Walgren[14] thinks that the skin is the greatest reservoir for salt. After an infusion of hypertonic saline solution, it has been shown that the lungs have the property of storing the greatest amount of salt. The normal salt elimination does not appear simultaneously with the crisis, but several days thereafter sodium chloride appears in increased quantity in the urine.

Clausen[15] found an increased elimination of acids in the urine associated with salt retention. At the time of the crisis, with the increase of salt elimination, there was a diminished excretion of the organic acids in the urine. Consequently he thought there was a relationship between the retention of chlorides and the production of acid. It has been suggested that there is a certain degree of acidosis in the blood serum during pneumonia. Where these acids come from has not been determined. The increased decomposition of protein is not without significance. It is probable then that there is an increase of acid products in the blood serum and an increase of acids in the urine during pneumonia (Palmer). Von Noorden, Tachau and others believe that a hyperglycemia exists with a certain degree of regularity.

Gerstenberger, Burhans, Smith and Wetzel[16] found a hypocalcemia in children with pneumonia and Jansen[17] confirmed this finding in adults. They thought that this diminution of calcium in the serum is coincident with the diminution in the chlorides. These authors also found that the amount of inorganic phosphorus was decreased. Kramer and Tisdall[18] found that the potassium is sometimes decreased, though it may be normal. An increased viscosity of the blood in pneumonia has been repeatedly described.

Erich Nassau and Herbert Pogorschelsky[19] divided the pneumonias into two groups:

(1) Those with a favorable course and; (2) those with severe constitutional symptoms and frequently fatal termination. In the first group the values for albumin, sugar, and salts of the blood serum were only slightly changed. In the acute stage of the disease they found a slight decrease in the blood calcium, a moderate increase in the amount of potassium, and the blood sugar was unaffected. In the second group the changes in the blood serum indicated basic disturbances. The albumin and sodium of the serum were little changed. At the height of the illness a hypocalcemia was found.

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[13]Fr. Müller: Deutsche med. Wchnschr. p. 1169, 1920.
[14]Walgren: Acta Med. Scandinav. supplement **16**: p. 643.
[15]Clausen: Arch. Int. Med. **35**: 571-575, 1925.
[16]Am. J. Dis. Child. **26**: 1923.
[17]Jansen: Deutsche Arch. f. klin. Med. **144**: 14-18, 1924.
[18]Kramer and Tisdall: J. Biol. Chem. **46**: 339, 1921.

In those patients who were severely ill, potassium was much increased. An antagonism between potassium and sodium was observed. The higher the potassium, the lower the sodium values. Hypoglycemia, and the increase in the potassium of the blood serum have been considered (Erich Nassau) the result of an irritation of the parasympathetic nervous system.

Two explanations are offered for the occurrence of icterus; first that it is due to the necrosis and degeneration of the liver tissue; second that a hemolytic icterus exists causing a destruction of the red cells. Eppinger[20] would compromise by considering hemoglobin disintegration and liver damage together as the cause of the icterus.

The mechanics of respiration and the exchange of gases in the lungs are materially affected in pneumonia. The frequency of respiration is increased, but it is superficial. The latter may be explained in part by the pain and also by the disturbance in respiratory regulation.

The disturbances in gaseous exchange are similar to those which occur in other infectious diseases. During the febrile period there is an increase in oxygen consumption.

In the smallest number of cases the diminution in the respiratory surface of the lung is significant in the production of respiratory embarrassment. As a rule death occurs as a result of general infection or circulatory disturbance. Even in those cases where there is a sufficient respiratory surface, symptoms of difficult breathing are observed due to an insufficient oxygen supply. In the infiltrated portion of the lungs gaseous exchange is impossible, but, nevertheless, the venous blood flows through this area. There is an interference with the arterial circulation. On account of the superficial breathing there is an insufficient amount of air inspired.

Dyspnea, as indicated by increased frequency of respiration, dilatation of the alae nasi and inspiratory retraction, may be explained in part on the basis of diminished respiratory surface. In addition, involvement of the muscular system and the nervous mechanism concerned in respiration are perhaps of greater significance. In any severe case of pneumonia the accessory muscles of respiration are brought into action and a compensatory emphysema is not infrequent. One observes a barrel-shaped thorax in many of these patients.

The diaphragm also is affected in its normal movement by the distended lung above, and the tympanitic abdomen below. Nassau further points out that the tonus of the abdominal muscles may be relaxed and consequently the diaphragm, sustaining pressure from the thorax, fails to receive the usual counterpressure from the abdominal muscles. These atonic conditions which develop in some forms of pneumonia increase the respiratory difficulty of the diaphragm, so that it flutters between the thorax and the abdomen.

It has been pointed out that normal respiration in an infant occurs only with the normal and undisturbed function of the diaphragm. Diminished function of the latter may lead to congestion of the liver and stasis in the portal system, resulting in distention of the intestinal coils.

Hitzenberger[21] notes that if one examines the diaphragm of a person who has died of pneumonia, changes in the musculature are apparent. The homogenous structure is lost and there is frequently a moderate lymphocytic infiltration. One may readily understand from such changes that the movements of the diaphragm may have been impeded and its excursions limited.

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[19]Ztschr. f. Kinderh. 41: 326-330, 1926.
[20]Deutsche Med. Wchnschr. p. 566, 1930.
[21]Hitzenberger, Karl: Das Zwerchfell, 1927, Vienna, Julius Springer.

SYMPTOMATOLOGY

In considering the symptomatology of the pneumonias of childhood, one must follow some system of classification. The elementary pathologic studies of pneumonia may be grouped into two main divisions, the lobar and the bronchopneumonic types.

Bronchopneumonia is the type which occurs during the period of infancy. Lobar pneumonia, though it does occur, is relatively infrequent, is marked by a sudden onset, usually by a critical termination and in the majority of cases by a benign course. It occurs with the greatest frequency after the second year of life.

Engel[22] maintains, on the basis of the course of the disease, temperature curve and the roentgenologic examination, that lobar pneumonias occur more frequently than is commonly thought. He points out that the mortality rate of lobar pneumonia in young childhood is low and conversely, bronchopneumonia runs a more unfavorable course, and there is greater opportunity to study it at autopsy.

The bronchopneumonias during the period of infancy require the most serious attention and thoughtful study of the pediatrician. After the sixth month of life the secondary bronchopneumonic processes are most common. They occur in severe nutritional disturbances due to a congestive process in the lung. During the first month of life the aspiration pneumonias are most frequently met with. The usual bacteriologic finding in all types of pneumonia occurring during childhood is the pneumococcus, more seldom the streptococcus. This has been proved by puncture of the lung during life. On postmortem examination other organisms are found, such as, streptococci, influenza bacilli, and diphtheria bacilli. The latter organisms are not usually obtained by lung puncture, and their presence is often the result of an agonal invasion. It has been stated on the basis of bacteriologic studies that 88 per cent of all forms of pneumonia in infancy are due to pneumococci. The organisms which are found in the pharynx are varied and numerous, but do not necessarily correspond in type or morphology with those found in the lung tissue of pneumonia patients.

The table of Heim, Kramer and Györy[23] presents the comparative incidence of the different types of pneumococci in healthy individuals and children suffering from pneumonia.

	TYPE I	TYPE II	TYPE III	TYPE IV
Healthy individuals	6.8%	18.2	28.1	52.9
Pneumonic patients (adults and children)	54.5%	18.1	18.2	12.1
Children under 2 years with pneumonia	8.3%	16.7	25.0	50.0
Children over 2 years with pneumonia	57.0%	28.0	0.8	14.2

It might be thought that this etiologic knowledge should form the basis of a classification of the bronchopneumonias of childhood, but the streptococcus and staphylococcus infections do not produce a type of clinical pneumonia which may be differentiated clinically from the various forms of pneumococcus pneumonia. If this be true then it is evident that an etiologic grouping is not feasible.

To resume the question of classification we will confine ourselves to a consideration of the bronchopneumonias of infancy. From the standpoint of prognosis, treatment, and clinical instruction, the most useful classification is based on the clinical manifestations and bedside observations.

[22]Verhandl. Deutsche Gesellsch. f. Kinderh. p. 195, 1928.
[23]Heim, Kramer, and Györy: Arch. f. Kinderh. 89: 1930.

The older authors divided bronchopneumonia into two types: the acute and the chronic. The French authors make 5 divisions: (1) the mild; (2) the moderately severe; (3) the severe; (4) the chronic bronchopneumonia; and (5) the cachectic type.

It will be recalled that Holt and Howland[24] divide the bronchopneumonias into: (1) the acute congestive type; (2) the acute disseminated (capillary bronchitis); (3) lobular pneumonia of the common type; and (4) the protracted form.

St. Engel[25] considers three groups: (1) the moderately severe lobular type; (2) the severe lobular pneumonias, particularly such as occur after infectious diseases; and (3) the more septic forms, which rapidly involve the serous membranes and lead to empyema.

Finkelstein[26] distinguishes: (1) a slowly developing bronchopneumonia; (2) a severe type running a rapid course, particularly in young infants under three months of age; (3) a type with a sudden onset resembling croupous pneumonia in its origin and course. Any one of these three types Finkelstein thinks may be associated with symptoms such as asthmatic breathing, spasm of the bronchi, tendency to asphyxia, cerebral, and intestinal manifestations; (4) the grippal pneumonias of premature and delicate infants, also spoken of as asthenic pneumonia; and (5) pneumonias characterized by the formation of abscesses.

Perhaps the most useful and most inclusive clinical classification which has been suggested is the one which Erich Nassau[27] proposed. This classification has been slightly amplified by Ludwig Meyer[28]:

TYPES OF BRONCHOPNEUMONIA

Nassau and Meyer

(1) Pulmonary form
(2) Cardiovascular form
(3) Atonic form
(4) Intestinal or alimentary form
(5) Meningeal or eclamptic form
(6) Toxic or septic form, not invariable many combinations possible
(7) Asthenic pneumonia
(8) Subacute asphyctic type of young infants

PULMONARY FORM

In this type the pulmonary symptoms predominate, and while other organs may be involved, difficulties of respiration are most marked. The onset of this type of the disease is not severe. At first the patient does not give the impression of being severely ill, fever is for the most part high and lasts as a rule for six to nine days. The color of the patient is good, though there may be a slight cyanosis of lips, fingers, and toes. The skin is not cool or pale, and the turgor remains normal. There may be edema of the chest wall, which is an early symptom in bronchopneumonia. The muscle tonus remains intact, the abdominal wall remains tense, because the cardiovascular system is not involved. Ordinarily this type runs a uniform course. The heart as shown in the x-ray picture may be distended and frequently dilated to the right, indicating congestion in the pulmonary circulation.

[24]Holt and Howland: Diseases of Infancy and Childhood, 1926.
[25]St. Engel: Monatschr. f. Kinderh. 41: 6, 1928.
[26]Finkelstein, H.: Lehrbuch der Säuglings Krankheiten, 1924.
[27]Ztschr. f. Kinderh. 41: 4, 1926.
[28]Meyer: Monatschr. f. Kinderh. 41: 1 and 6, 1928.

Walgren[29] called attention to the displacement of the heart in unilateral pneumonia of children. He found that the heart was temporarily displaced toward the affected side.

J. P. C. Griffith[30] has also observed that there is a cardiac displacement toward the affected side and a high position of the diaphragm on that side. X-ray studies showed that at the time of resolution or shortly thereafter the heart resumed its normal position. If the pneumonic process is protracted the return of the heart is delayed as well. In most of the cases observed the pneumonia was of the croupous type. The occurrence of the displacement has been thought by Thones and Walgren to be due to a distention of the unaffected lung. This subject has added interest because a similar displacement is known to occur in massive collapse of the lung.

The inflammatory area in the pulmonary type of bronchopneumonia is usually diffuse; several lobes are involved. Small pleural exudates with fibrin deposits are almost constantly present. Dyspnea, disturbing, irritating, or loud barking cough, restlessness, and crying are frequent. The desire for liquid food may remain undisturbed, though it may diminish when the effort of drinking causes difficult breathing and coughing. The weight remains stationary, or increases very slightly. The gastrointestinal function is not frequently affected. The disease seems to be confined to the lungs. The efficient work of the heart, muscles, and the diaphragm, compensate for the disabled respiratory function. If the course of the disease should be unfavorable, cyanosis and meteorism may occur, though the abdominal muscles continue to be tense. Dyspnea occurs with a falling blood pressure and the pneumonia may merge into one of the severer types to be described later. Under such circumstances, the face assumes an anxious expression, the fever increases, and the child may expire. Usually death occurs after a long illness, not during the first days. Frequently the patient apparently improves though a relapse caused by new areas of inflammation lead to a more severe attack which terminates fatally.

The pulmonary form of bronchopneumonia resembles in many respects the lobar type of older children. In general, the prognosis in this form is comparatively favorable.

CARDIOVASCULAR FORM

The cardiovascular form stands almost in direct contrast to the type just described. It is characterized by cardiac and vascular failure. In the very first days of the illness, these patients are cyanotic and have an anxious expression. Very shortly marked dyspnea is observed, though there is slight to moderate evidence of pulmonary involvement. Obviously the symptoms are due to cardiovascular dysfunction. About the same time dilatation of the alae nasi is observed, as well as deep retraction of the lower portion of the thorax, grunting breathing, increased dyspnea, and sometimes a short cough. Striking symptoms are restlessness and anxiety. Almost at the onset meteorism is present. The superficial veins of the abdomen are visible. The liver and spleen may be palpable and enlarged as a result of splanchnic congestion. The blood pressure is low or sinks rapidly, the pulse is soft, the heart's action is rapid, and as the disease progresses cardiac irregularities occur.

Periods of bradycardia indicate the disturbances of cardiac effort. The heart tones become muffled. The x-ray shows that the heart is enlarged. If the vasomotor centers become affected, there is a continuous change in the appearance of the patients. The skin takes on a greyish hue, or at times it assumes a marked pallor; this color may again be replaced by a cyanotic hue, which increases to the

[29]Acta Pediat. 3: 80, 1923.
[30]Am. J. M. Sc. 174: 448-453, 1927.

point of asphyxia. At any moment the patient is in danger of collapse. The nutrition suffers; while the child may grasp the bottle eagerly, possibly takes a few sips, the distressing air hunger, renders further sucking impossible. Briefly then it may be said that the cardiac or vascular form of bronchopneumonia is for the most part an expression of disturbed function of the heart and the vascular system.

As a result of the severe congestion, a marked degree of air hunger occurs. It has been suggested that disorders in the innervation of the vessels, and heart may be factors which produce this variant form of pneumonia in children.

It must also be taken into account that the toxin of the pneumococcus may directly damage the cardiovascular system.

ATONIC FORM

In many respects this form resembles the cardiac type, though the vascular failure seems to exert the greatest influence in the production of atony.

At the onset of the disease the skeletal muscles show loss of tone. The arms and legs are flaccid, as if paralyzed. The abdominal wall is readily compressible and the coils of intestines may be palpated. It is true that meteorism may occur, though it never takes on the extreme severity which occurs in the cardiac form. The diaphragm is affected as well as other muscles. As a consequence of the atony of the diaphragm, the liver descends and may be readily palpated. The patients are quiet and move but little; the blood pressure is always low. The falling blood pressure indicates a loss of tonus.

In children, as in adults, the determination of blood pressure is an accurate index of the integrity of circulatory conditions. The pressure observation should be taken daily at about the same hour each day. A maintained pressure is a favorable sign while a low or falling blood pressure, indicates unfavorable progress of the disease.

If the muscle tone is not increased, or improved, these patients die after a brief period without additional terminal symptoms.

The course of this type is characterized by marked asthenia, muscular relaxation, psychic weariness, and fatigue.

ALIMENTARY FORM

The onset of this form of bronchopneumonia differs from those which have been mentioned previously. In this group loss of weight, diarrhea, vomiting and other alimentary symptoms attract immediate attention. Some time elapses before the pulmonary involvement is suspected. The loss in weight is the most striking prodromal symptom. Severe general disturbances indicate the pulmonary nature of the disease.

The skin assumes a greyish hue. Occasionally a mild degree of coma occurs. Moderate tympany may be present. It is obvious that a differential diagnosis between this form of bronchopneumonia, and alimentary intoxication may present the greatest difficulties. In any event the appropriate treatment for the alimentary symptoms should be instituted promptly and early. In this way the alimentary aspect of the disease may ameliorate, and the pulmonary involvement may be recognized.

MENINGEAL AND ECLAMPTIC FORM

In the meningeal form the existence of meningitis is readily suggested; such symptoms as rigidity of the neck, opisthotonos, rigidity of the extremities, spasm of the muscles of the eyelids and mouth, and general convulsions may occur. Occasionally there is paralysis of muscle groups. The reflexes are usually normal. The

pressure of the spinal fluid may be slightly increased. The fluid is clear, the globulin tests are negative; sugar is usually present; the cells as a rule are not increased. Unconsciousness may last from five to seven days. Consciousness may return several days before the defervescence of the fever. In the unfavorable cases patients become pale, muscles hypotonic, tympany and low blood pressure are terminal symptoms.

The eclamptic form is characterized by recurring spasms. The patients constituting the eclamptic type gave evidence that spasmophilia was converted into manifest tetany during the pneumonic attacks.

TOXIC AND SEPTIC

This type is characterized by the acute and fulminating onset. In the midst of perfect health without previous fever the patient in a few hours becomes profoundly ill and goes into collapse.

The onset is characterized by restlessness, great anxiety, cyanosis or a grey color of the skin. The fever is immediately high, 105° or above, though occasionally the patients are afebrile. Unconsciousness at the onset is not the rule, the patients appear to suffer pain. Breathing is superficial, pulse not to be felt, blood pressure low. Muscle hypotonia is observed. The extremities seem paralytic and there is a high degree of meteorism, as a rule. The heart is dilated and symptoms of cardiac and vascular failure occur in a few hours. Edema and congestion may develop; convulsions and coma may be terminal symptoms. Paracentesis of the chest shows early a seropurulent exudate. In some cases the necropsy shows a fresh bronchopneumonia with congestion, emphysema, and purulent bronchiolitis. In a large number of patients one observes pinpoint to pea-sized abscesses; upon opening these softened areas it is noted they are filled with a green, thick pus. It is assumed that these pneumonias are of hematogenous origin. The course of this form of bronchopneumonia seldom lasts longer than forty-eight hours; it frequently occurs in infant asylums and hospitals.

Mixed forms of the types that have just been described may occur, thus a cardiovascular type may be associated with hypotonia. Or the alimentary with a cardiovascular or atonic type.

Richard Grosser[31] attempts to simplify Nassau's classification. He divides bronchopneumonia into two main groups based upon clinical observations, supported by bacteriologic and autopsy findings.

1. Localized pneumonia without general infection.

2. Pallid pneumonia. (He gives this designation because of the pale appearance of the skin.) This type of the disease frequently runs a septic course. Metastasis of pneumococcus infections to various organs may cause meningitis, nephritis, peritonitis and arthritis.

The severest form of pneumonia is presented as the hyperacute or fulminating type, according to Grosser.

Grosser's classification has the advantage of simplicity, though it lacks the detail of clinical description contained in Nassau's monograph.

According to Grosser, patients with localized pneumonia present a flushed appearance so long as the heart and circulatory system remain intact. If circulatory failure occurs, the skin takes on a bluish tinge. Restlessness and dyspnea occur. Even in this "blue" form (Grosser) of pneumonia the prognosis may still be favorable.

In contrast to Group I, the pallid pneumonia must be considered a serious disease, owing to the serious metastases of pneumococci in tissues and organs. He distinguishes a subform which he calls the grey pneumonia, which occurs in pre-

[31]Monatschr. f. Kinderh. 39: 1 and 2, 1928.

mature and delicate infants. This type corresponds to asthenic pneumonia of other classifications. Following out this classification based on variations in skin color, we note that the localized or red form together with the so-called blue pneumonia, corresponds with Nassau's pulmonary group. In the pallid group is included all of the severe and fatal forms which may include the cardiovascular and atonic groups of Nassau. Grosser's classification includes in this form a general involvement of the whole organism. Ludwig Meyer, in commenting on Grosser's classification, says that even these boundaries defining the course and the progress of pneumonia are not always respected by natural processes.

SOME RARE FORMS OF BRONCHOPNEUMONIA—INTRAUTERINE PNEUMONIA

The subject of amniotic sac contents in the lungs of infants was recently reviewed by Sidney Farber and Lewis K. Sweet,[32] who note that Ahlfeld in 1888 pointed out that the fetus in utero could make respiratory movements and aspirate amniotic fluid. The aspiration of infected amniotic fluid may produce antenatal and postnatal pneumonias. The most important contents of amniotic fluid are cornified, desquamated epithelial cells, lanugo hairs, and meconium.

Loeschke notes that there are only three or four authenticated cases where intrauterine pneumococcus pneumonia occurred as the result of maternal infection with the same disease. The aspirated amniotic fluid may be present in moderate quantity, though the large and terminal bronchi may be obstructed and the patient literally drowned in amniotic fluid. If the aspirated fluid contains meconium, an inflammatory reaction is noted about this foreign material. Loescke has found meconium and amniotic fluid four days after birth, though in some instances it has been observed as late as five weeks postpartum. Out of 32 bronchopneumonias before the sixth month of life, he found 11 cases where aspiration material was demonstrated in the bronchi, but he observes that other cases may have been due to the same cause. After the lapse of some time the foreign material tends to disappear, especially if the pneumonic process is protracted.

OTHER FORMS OF ASPIRATION PNEUMONIA

In infants of any age various substances may be aspirated and produce pneumonia. Among these substances may be mentioned dusting powders, stearate of zinc, cereal foods, fats, and oils, such as mineral oils which are used as nasal drops or for internal use in constipation, cod liver oil, and foreign bodies of almost every variety.

In the recent literature cases are reported where aspiration of farina, mineral oil inhalants and stearate of zinc have produced pneumonia.

Henry Pinkerton[33] reports six cases where fatty or oily material was found in the bronchi and lungs. He also quotes Laughlin of Toronto who reports four cases where oily substance was found in the lungs in fairly large quantities. Pinkerton believes that the oil finds its way into the alveoli of the lungs by direct aspiration into the trachea and also when administered as spray or drops into the nose or throat.

The aspirated material whether it be oil or food, may act as an irritating foreign body, causing cellular infiltration and fibrosis. Following a mechanical irritation, we may assume that infection is superimposed and pneumonia results.

RHEUMATIC PNEUMONIA

Pneumonia of rheumatic origin has been a controversial subject. The possibility of the simultaneous appearance of pneumonia with rheumatism has been

[32] Am. J. Dis. Child. 5: No. 42, 1931.
[33] Am. J. Dis. Child. 33: No. 2, 1927.

considered by many writers. In cases of rheumatic carditis where extensive dilatation occurs; pulmonary atelectasis produced by compression of the lung, may give rise to an area of dullness with bronchial breathing located usually at the left angle of the scapula. Benjamin A. Gouley and John Eiman[34] have recently pointed out that a specific rheumatic pneumonia may occur in the same way as a rheumatic polyarthritis or pleurisy. These authors found that the histologic study of the lung showed an acute interstitial inflammatory process characterized by hyperemia, edema, and a perivascular infiltration of large endothelioid cells, multinuclear giant cells, plasmocytes, lymphocytes, and relatively few polymorphonuclear leucocytes. The staining and general appearance of the endothelioid and giant cells are identical with those found in the Aschoff nodules of rheumatic patients. These cases are nearly always associated with rheumatic heart disease and in many virulent cases of rheumatic fever an associated pneumonia may be present.

It would be impossible to discuss all of the voluminous literature on this subject, which is of vital interest to us all. I have selected some of the outstanding contributions, which I have thought would emphasize the most recent progress in our knowledge of pathology and symptomatology. Much is still to be learned about every phase of this disease. It is to be hoped that further study and investigation will throw additional light on the nature, course, and treatment of the pneumonias of childhood.

Etiology, Bacteriology and Immunology of Pneumonia

Dr. Horton R. Casparis

DR. CASPARIS.—In discussing the etiology, bacteriology, and immunology of pneumonia in children, there is not much to present that is of practical value, for the reason that our present knowledge of these subjects offers little information that we can use advantageously either in treatment or in prevention. However, because of the quality of the investigative work that is being carried on at present in connection with pneumonia, I believe we can look forward expectantly for results which should definitely change the situation.

In regard to the bacteriology of pneumonia, from examination of the sputum and from lung punctures of patients with pneumonia, and from postmortem examination of the lungs of some, it has been learned that the pneumococcus is the bacterium associated with the great majority of attacks of lobar or so-called primary pneumonia. As we all know, pneumococci have been divided into four types called Types I, II, III, and IV. Number IV is not really a type but is a group which is made up of a heterogeneous lot of pneumococci. More recently this group has been divided into a number of different types.

As well as being responsible for lobar pneumonia, the pneumococcus is not infrequently associated with bronchial or so-called secondary pneumonia, but in the majority of cases other types of organisms are held responsible for bronchopneumonia. There is often a mixed infection with the influenza bacillus, the staphylococcus, and the streptococcus, being prominent members of the mixture, or they may appear alone in association with bronchopneumonia.

As the cause of lobar pneumonia, various types of the pneumococcus predominate in different localities. For example, in a series of cases reported from Scotland Type II pneumococcus predominated. Mentioned in the same communication was a series reported from this country in which Type I predominated. In bronchopneumonia on the other hand, in a series of 105 cases the pneumococcus seemed to be responsible in 32, and other organisms in 73 cases. And still in another series of 312 cases of influenza pneumonia, pneumococci were reported in 94, Staphylococcus aureus in 92, influenza bacillus in 19, streptococcus in 13, and

[34]Am. J. M. Sc. 183: 359-381, March, 1932.

a mixture of these and other organisms in the remaining 96, showing as indicated above that organisms other than pneumococci play the most prominent rôle in bronchopneumonia. However, in a series of 126 postoperative bronchopneumonias, the pneumococcus of the kind found most often in the sputum of normal individuals (Group IV) was associated with the pneumonia in 73 out of the 126 cases, and other types of pneumococci accounted for 22 more of this series.

After this brief discussion of the bacteriology of pneumonia, let us now consider the question of whether or not these organisms can be considered the entire etiologic factor in pneumonia. Is it not likely that some virus or other predisposing factor comes first and that these organisms are secondary invaders, at least, in the case of bronchopneumonia? We know that pneumonia not infrequently follows the aspiration of foreign material into the lungs, such as food, foreign bodies, zinc stearate, etc. It also often follows certain diseases such as laryngeal diphtheria, whooping cough, and measles. Further, pneumonia in some instances follows anesthesia, it occurs in markedly debilitated individuals and in those kept deeply under the effect of sedatives for prolonged periods. Are these latter ones aspiration pneumonias? Is the irritation from the anesthetic a predisposing cause? In the case of lobar pneumonia, does the development of pneumonia depend on the amount of organisms taken in, their virulence, lack of immunity of the individual, lowered immunity produced by chilling or some previous infection, or on what does it depend? There is still much to be learned about the etiology of pneumonia. The solution of the problem is difficult because it is not easy to produce pneumonia in experimental animals, and especially a pneumonia that has at all a similar clinical picture to that in human beings.

As for the immunology of pneumonia quite a lot is known, but the successful application of this knowledge has not yet been particularly fruitful. An attack of pneumonia does not seem to produce any immunity to subsequent attacks. Certainly all of us have seen repeated attacks of pneumonia in the same individual. There are two findings which I do not like to see occur in lobar pneumonia for in my experience they indicate a poor response on the part of the patient or an overwhelming infection. They are a low leucocyte count and a poor febrile response. Vaccines for the purpose of producing some sort of immunologic response have not been successful. Serums have been made to use in combating certain types of the pneumococcus. The serum used most commonly is for Type I and, although not strikingly beneficial, it seems to produce results sufficiently definite in some cases to make us feel that as more is learned this phase of immunologic work offers promise of better results.

There is in my opinion a brighter and more hopeful outlook in the work that is being carried on by Avery at the Rockefeller Institute. He reports that the pneumococcus which resists most ably the various methods of attack of the individual is covered with a waxy capsule which is chiefly carbohydrate in nature, and that he has found a certain bacterium which produces a ferment that will dissolve that capsule leaving the pneumococcus readily vulnerable. His results with the use of this ferment in experimental animals have been entirely successful, but I think he feels that he must make some further studies before the information which he has is ready for clinical application.

DR. THORNTON.—Has the temperature anything to do with it?

DR. CASPARIS.—I like to see a high temperature in lobar pneumonia, and I make no attempt to reduce it, for I feel that the high fever is probably helpful in destroying the infection.

DR. KENNEDY.—How about blood cultures?

DR. CASPARIS.—We do not make blood cultures, but it has been shown that a small percentage of children with lobar pneumonia do have some pneumococci

in the blood stream. Since practically all of our children with lobar pneumonia get well, we do not type the organisms nor do we culture the blood. It might be better to carry out these procedures in the sicker patients, for it is possible that they might be benefited by serum treatment.

DR. MOORE.—Are there any particular reactions from the use of serum?

DR. CASPARIS.—I think the same that one frequently sees after the use of any horse-serum preparation.

DR. ABT.—Is it true that in children under two years of age, Groups I and II are found more commonly?

DR. CASPARIS.—I do not know. In one series including both children and adults, the adults were chiefly Group II, and the children chiefly Groups I and IV.

DR. SEGAR.—For one or two years we used diathermy in the treatment of pneumonias at the Children's Hospital. We have done transfusions in cases of severe infection with anemia.

DR. CASPARIS.—A number of years ago we transfused several children with lobar pneumonia and felt that we got definitely bad effects. We do frequently give small transfusions to those children with low leucocyte counts and low temperatures who do not seem to be responding well, also to those with delayed resolution.

DR. ABT.—Do you not think that transfusion is one of the most overused treatments?

DR. CASPARIS.—Yes, I do think that in hospitals where they are easily done there is a tendency to abuse the use of them.

Diagnosis and Treatment of Pneumonia

Dr. L. R. DeBuys

DR. DeBUYS.—The subjects assigned to me in this round table discussion are the diagnosis and treatment of pneumonias. Much time which is not available can be consumed in the consideration of the two topics. It will not be my purpose, therefore, to attempt to cover the entire subject but to mention some points and emphasize others which seem to be worth while.

There are many differences in the care of patients in the home, and the care of the patient in the hospital. Likewise there are differences in the care of the patient in the medical center, and the care of the patient remote from these centers. In my remarks I shall not attempt to make any differentiation in these influencing factors but will consider the diagnosis and treatment of the pneumonias as is our custom in the Touro Infirmary, fully realizing that many of the things that we do would be difficult to carry out in the home and impossible in rural sections.

The examination of the patient includes the usual careful history-taking and the thorough physical examination with the observations noted on inspection, palpation, percussion, and auscultation. It is not necessary to go into these findings before such a body as is gathered here today. The physical findings of each of the pneumonias are known to all of us. I do wish, however, to call attention to some things which may be worth while to help us in our findings, and to assist us in completing our examination with the least amount of unnecessary loss of time, and exhaustion of the patient. The frequent race to the patient's bed, in the hospital with the nurse, and in the home with some member of the household, is to be avoided. While it is realized that it is the eagerness to prepare the patient for the examination by the physician which prompts it, nevertheless, if the examiner were permitted to approach the bed quietly and observe the patient for a while before using his stethoscope, much valuable information can

be secured. Does he appear to be sick? Is he very sick? Is he cyanosed? Is he breathing with difficulty? Is he comfortable in a certain position? Is his respiration jerky? Is there a respiratory grunt? Is there cough? Are there movements of the alae nasi? Are the respirations fast? These, and probably some other observations, are of value in considering pneumonias. What is the rate of the respiration? When should it be taken? What is the pulse rate? When should the pulse be counted? These two latter should always be recorded when the patient is asleep in order, first to record them accurately, and, second for comparative purposes. The group of symptoms of movement of the alae nasi, rapid respiration, jerky shallow respirations, respiratory grunt, should always require the excluding rather than the proving of the existence of pneumonia, especially when they are associated with fever and cough.

The rapid respiration we interpret as evidence of the patient's response to the need of oxygen because of a smaller lung area in operation. The jerky shallow respiration, and the respiratory grunt are indications of the involvement of the lung surface and its pleural covering with the resulting pain upon the movement of the pleural surfaces. We have noted that the pneumonias beginning away from the surface do not have these two symptoms until the pleura is involved. The respiratory grunt and jerky respirations are more frequent in the lower lobe and basal involvements than in the apical pneumonias.

For the physical examination the patient's clothing should be removed so as not to interfere with the accuracy of the findings. I do not mean that it should be entirely nude but the body sufficiently uncovered, so that the clothes will not interfere with the respiratory movements, and also will not produce misleading sounds. The patient should be so placed, preferably flat in bed, so that the comparison of the two sides will be possible.

Very frequently the baby will cry. This is not bad, because much information may be secured when crying and much may be obtained between crying spells. Incidentally in pneumonia if there is much crying, which is vigorous, it bespeaks usually not a very great involvement. Many times, however, the patients cry with difficulty. Crying may be helpful to secure certain information when inspecting, palpating, and auscultating the patient. All noises and talking must be excluded while the examination is in progress because between cries not infrequently much of our information is gathered.

In palpating the thorax of the baby the fingers should be placed lightly over the body surface in order to obtain the best results. Advantage of the baby's cry is at times very helpful.

In percussion, the best results may be obtained if the percussion stroke is begun so light as to not produce a note, then to gradually increase the stroke until the note just comes in and then to use this same stroke over the entire thorax.

In palpating, percussing, and auscultating, corresponding areas of the two sides should be examined for the purpose of comparison inasmuch as different patients give different information depending upon the lung development, body development, amount of muscle, and amount of adipose tissue. In auscultation because of the facility with which sounds are transmitted from above into the lung it should be remembered that if the sounds are identical, by the comparative method of examination, on the two sides the chances are that they are transmitted from above the bifurcation. This can be proved by asucultating above the bifurcation of the trachea when the same sounds will be found.

In bronchopneumonia, or secondary pneumonia, as contradistinguished from lobar or primary pneumonia, auscultation reveals probably more than the other means of examination, bronchitic signs being in evidence. A sign which I have

noted for many years, the new harness sign, as of rubbing two surfaces of leather together, is always indicative of bronchopneumonia. This sound may be heard when placing the stethoscope near the mouth of the patient.

The practice in my service at the Touro Infirmary for many years has been to make routine x-ray examinations of the lungs in cases admitted with respiratory disturbances. In this way we have collected quite a variety of pneumonias and have followed them with serial radiograms at stated intervals. We have pneumonias beginning at the surface of the lung and which have extended toward the hilum; others which have been apparently central and which have extended toward the surface; and others which have involved an entire lobe and which shadows, at first hazy, later becomes complete consolidation. In the series we have also seen empyema in its development following an acute pneumonia.

Routine blood examinations are always made and the value of the usual leucocytosis and polymorphonuclear increase need no emphasis here. The significance of the blood findings in their relation to prognosis is of great value. More recently Schilling counts have been made and are of interest.

Blood cultures and the examination of coughed-up material are included in our routine. Positive blood cultures are obtained in only a small number of instances and when present foretell a serious condition. The sputum is secured by means of tickling the pharynx and with a swab the coughed-up material is caught and cultured. The findings of these two procedures are mostly valuable for prognostic purposes. The mortality of cases of Types II and III has been greatest but more cases of Types I and II die because of the greater incidence of these latter cases.

While the various means for corroboration of the diagnosis of pneumonia are utilized by us, it is the policy of the service to make our examinations complete first and to commit ourselves as to the diagnosis before resorting to these methods.

With regard to treatment: Rest in bed, proper elimination, comfort for the patient, counterirritation, and symptomatic treatment are the basis of our care of pneumonias.

If the patient is in bed and quiet his pulse and respirations will be at their minimum. The heart is thus spared as much as is possible and the inflamed lung is rested as much as is possible. All our pneumonia patients are put in an oxygen tent. While we have realized that anoxemia is regarded as the primary indication for the use of oxygen, we have also noted that in those cases that present the outward manifestations of anoxemia and in which oxygen is employed, many of them terminate fatally. It is very likely that the administration of oxygen has been administered too late. When I am told that so-and-so has pneumonia and that it has been found necessary to give oxygen, I await the sad news of a fatal termination. If oxygen is expected to be of use when these grave symptoms are established my reasoning has been why not give it early and not wait for the earliest evidences of anoxemia, but anticipate them so that should they appear the treatment has already been instituted? In many of our cases of bronchopneumonia the little patients who have been treated previously with oxygen ask for it, the older ones claiming to have experienced relief with its use. If the rapidity of the respiration is an indication of the patient's need for oxygen, why not let him have it? We have no difficulty in discontinuing the oxygen, which is done gradually.

One of the treatments of pneumonia which has been much overwritten is the cold air treatment. With personal experience and experience with my own family, I have long ago concluded that it is much more comfortable for the patient to be given all the fresh air that is necessary but it need not be cold, especially in bronchopneumonia, and may come from an adjoining room, and never should the patient be subjected to a draft.

When there is a gastrointestinal disturbance present it is our custom to give a mild calomel purgative in one dose with phenolphthalein followed by an enema in two hours, after which no protein food is given but both soluble and insoluble carbohydrates fed as freely as possible and regularly. In this way we believe we are excluding the gastrointestinal tract as a contributing factor to the symptoms present. Proper elimination is continued if necessary by the administration of milk of magnesia.

Counterirritation is a routine measure with us. It serves the purpose of maintaining a uniform warm temperature to the thorax at the same time producing a counterirritation. Naturally this cannot be obtained by the use of the frequently employed poultice with mustard, because with the poultice the patient is placed in a warm mushy mass which cools sooner or later and becomes cold. Incidentally, enveloping the infant's thorax with the poultice interferes with its respiratory movements. Turpentine and olive oil in the proportion of eight parts of turpentine and one part of olive oil serves the purpose nicely. This can be applied without disturbing the patient and at sufficiently frequent intervals as to produce an erythema. The overaction of the turpentine may be easily controlled by the use of pure olive oil. This is rarely necessary. An oiled silk jacket over the undershirt will continue the effect of the turpentine and oil applications over a longer period so that the patient is less disturbed. This counterirritation decidedly reduces the pain and contributes to the comfort of the patient. We do not use ice bags to the chest, and any attempt at fixation of the chest is to be most vigorously condemned.

The temperature in pneumonias should be looked upon as a guide as to what is taking place. We do not give baths or sponges to reduce temperature in our service. Aside from an ice bag to the head and an occasional tap water enema, and preferably not the latter, no hydrotherapeutic measures are employed in our pneumonias. An antipyretic such as phenacetin combined with a little caffeine and aspirin is given for hyperpyrexia. We have never had any ill effects with this combination. Of course the doses should be properly adjusted.

An alkaline cough mixture with some stimulating expectorant and aromatic spirits of ammonia are about the only additional drugs that we use in our cases of pneumonia.

In the bronchopneumonias when the temperature has subsided and resolution is progressing nicely, we have found creosote of benefit. The position of the patient with bronchopneumonia should be changed from time to time.

DR. KENNEDY.—In a child of fourteen month with lobar pneumonia having temperature 106½° would you give it 2 grains of aspirin?

DR. DeBUYS.—At one year we give ½ grain of aspirin, ½ grain of phenacetin, and ⅛ grain of caffein to such a patient. As I stated we do not give baths to reduce temperature. I can realize that in private practice it may be difficult at times to refrain from giving a sponge when an anxious family is asking that something be done.

DR. THORNTON.—Do you make stereograms? Do you give glucose intravenously or otherwise?

DR. DeBUYS.—We do not make stereograms of the children, since it is difficult to have them in the upright position or to place the camera sufficiently far from them for the pictures.

We prefer not to throw any extra burden on the heart by intravenous injections. In giving glucose it may be given by the drip method. It has been our experience that this will not be tolerated very long. The solution usually employed is one ounce of glucose to the pint of water given at the rate of 18 drops

per minute continuously for an hour, every other hour. We sometimes add sodium bicarbonate to the mixture and in the same proportion.

DR. REISS.—I think you have failed to discuss a very important factor in the nursing care which to my mind is most important in the treatment of pneumonia; namely: attention to the distention of the abdomen. Do you make use of enemas?

DR. DeBUYS.—We do use enemas for the relief of distention.

In reply to Dr. Moore's question relative to the determination of the amount of acidosis. It is determined by the carbon dioxide combining power of the blood.

Sedatives are administered whenever they are necessary for quieting the patient. Whisky, I believe, is not indicated while there is high temperature. In the secondary type of pneumonia (bronchopneumonia) when it is of prolonged duration, whisky is indicated.

In making our serial radiograms we have not found that the patients were unduly exposed. In the very serious cases the radiograms have been made in the wards.

The blood cultures are taken when the temperature is on the rise or at its height because we know that the organisms are not always present in the blood stream but think we are more apt to find them in the circulation then. We look upon the rises of the temperature as responses of the individual to the infection.

I have never had a bad result in a patient to whom calomel had been given. The dose is always properly adjusted.

There is no doubt but that devoted and skillful nursing is a necessity particularly in pneumonia.

There is not only one method of treating pneumonia, there are many, and any perfected plan by a competent clinician is good. The unfortunate situation arises when it is attempted to combine, in compromise, the treatments of two or more good clinicians.

Academy News

Meeting of the Executive Board, held November 26 and 27, 1932, at Evanston, Illinois

Present: Dr. Samuel McC. Hamill
Dr. John Ruhrah
Dr. Clifford Grulee
Dr. Louis C. Schroeder
Dr. E. C. Mitchell
Dr. C. A. Aldrich
Dr. Frederick F. Tisdall

Meeting called to order by the President.

The Treasurer's Report was read by Dr. Grulee.

A question as to those Fellows delinquent in dues was considered and the Treasurer called attention to the fact that many of these have made special arrangements for payment.

The Treasurer's Report was adopted as read.

It was decided to hold the next meeting of the Academy on June twelfth and thirteenth, 1933, at the Edgewater Beach Hotel, Chicago. A tentative program was arranged with Round Table Discussions as one of the outstanding features.

The following subjects for discussion were chosen:

Allergy
Rheumatic Infections
Nephritis
Disorders of the Blood and the Hemopoietic Organs
Control of Communicable Diseases
Upper Respiratory Infections
Intracranial Lesions at Birth
Behavior Problems

It was decided that if it were possible to arrange with the Section on Pediatrics of the American Medical Association and the American Pediatric Society, that the Academy would pay part of the expenses for a foreign guest, provided he agreed to address the annual meeting.

It was voted to empower the Secretary to make arrangements for commercial exhibits at the meeting, also to have a luncheon on Monday, June 12, for members of the Academy.

The following committees presented no report:

Committee on Clinical Investigation
Committee on Nursing Education in Pediatrics
Committee on Relation to the White House Conference
Committee on Relation to the Section on Pediatrics of the American Medical Association.

The Committee on Medical Education reported by Dr. Veeder as follows:

The Committee on Medical Education has been studying the work of the Joint Examining Boards of Obstetrics, Ophthalmology and Otolaryngology. We are also in touch with the National Board of Examiners and the Federated State Boards of Examiners. Our problem in a great many respects is different from the Joint Boards who have a surgical training problem to meet.

It is becoming more obvious that the formation of a Joint Examining Board for Pediatrics should be established as a matter of self protection. It seems that we have reached a point where such a step will become almost a necessity if we are to avoid future troubles.

I am inclined at the present moment to think that the Committee will recommend to the Academy at its next annual meeting that steps be taken for the formation of such a Board in conjunction with the American Pediatric Society and the Section on Pediatrics of the American Medical Association.

Unfortunately, the American Pediatric Society meets before the Academy. The best plan we can follow is for the Committee report to be prepared and printed in the Journal in the April or May issue so that it may be brought up for discussion at these various meetings.

It seems that the proper procedure would be for the Academy to invite the other two organizations to appoint members to meet with this Committee who should be instructed to prepare definite plans as to the scope of educational training, examination, etc., and to report back in 1934 with a uniform plan for establishment of a Board for consideration at the annual meeting.

I do not see that the Academy Committee can go further than work out a rather broad plan and study the fundamental question of needs and necessities.

Two things at the present time seem to me to be quite essential. One, is sometime during the early part of the year, a meeting of a part of the Committee on Medical Education and I suggest Dr. Henry Helmholz, Dr. Thomas B. Cooley, Dr. A. Graeme Mitchell and myself who are located nearest one another. Second,

I think it will be necessary for some member of the Committee to spend a day in conference with the Obstetrical Examining Board, whose work comes closest to our own.

I request that the Executive Committee sanction the following expenses:

1. For a meeting of at least part of the Committee on Medical Education to be held sometime after the first of the year.

2. For a trip, if it is found necessary, to consult with at most two of the other Joint Examining Boards.

3. For stationery, postage and secretarial work involved in the committee work.

I would request that in the future the Chairman be allowed to keep an accurate record of all expenses and that this amount be refunded by the Academy.

The report was approved by the Executive Board.

It was moved and seconded that Dr. Veeder and his Committee be authorized to make a survey for the purpose of certifying pediatricians to be presented to the three Pediatric Societies; namely, the American Pediatric Society, the Section on Pediatrics of the American Medical Association and the American Academy of Pediatrics. Carried.

The Committee on the Relation of the Academy to Philanthropic Agencies, Welfare Workers, etc., reported that no material for decision had been received and that the Committee had already stated the general policy of the Academy which had been adopted at the New Orleans meeting. The Executive Board felt that the function of the Committee was to act upon specific instances in the future.

It was suggested for the Committee on Relation to the White House Conference, that their work was to take up the Follow-Up of the White House Conference in the various states, rather than to have this come through the Secretary of the Society.

The report of the Committee on School Health and School Health Education submitted by Dr. Moore, showed the efforts of that Committee to establish relationship with various educational departments throughout the country and the reaction of these to this advance. Any general statement of this reaction would be misleading since the individual answers were quite different. It was very apparent from reading these letters that the approach must be largely through local agencies, such as our State Chairmen and State Committees.

The Report of the Committee on Hospitals and Dispensaries was largely a report of progress since the matter has been taken up in perfecting a questionnaire for children's hospitals. The matter of the questionnaire was referred back to the Committee with approval.

Report of Region I

A meeting of Region I was held at the Academy of Medicine, New York City, on November 19, 1932, at 2 P.M.

Dr. Hamill spoke about the White House Follow-Up Campaign saying that the Committee would probably not be very active after January 1, 1933. The opportunities afforded the Academy in taking an active interest in the follow-up work were discussed at some length and the general feeling was that such an opportunity should not be missed.

Dr. Warren R. Sisson reported that in Massachusetts an interesting experiment was being carried out in connection with the State Department of Health at Naschova Union near Ayer, Massachusetts. Working with the Commonwealth Fund, a Community Health project is being developed. Dr. Morse has been very active in furthering this work. A full-time health officer is employed. One of the main objects of the study is to determine the best methods of teaching preventive pediatrics to the local practitioner. To further this end, a manual is being developed along the following lines:

1. Objectives and methods of Health Supervision.
2. The Health History.
3. The Health Examination.
4. Common Defects and Disabilities.
5. Feeding of Infants. Maternal Nursing. Artificial Methods.
6. Feeding of the Preschool Child.
7. Physical Care and Preventive Hygienic Measures.
8. Habit Training.
9. Control and Prevention of Infections.

Dr. Nichols gave the report for New Jersey. (This will be printed in full.)

Dr. Foster, reporting on Maine, spoke of the fact that most of the pediatric activity which was limited at the best, was confined to the eastern sea board and the chief problem was to reach the interested general practitioner of the northern and western parts of the state. He expressed his pleasure at being able to hear the interesting experiments of New Jersey and Massachusetts and thought he would certainly be able to initiate a program at least partly in keeping with these two states.

Dr. Henry E. Utter reported that the Child Welfare Work was well covered in Rhode Island and that the present problem was to determine in what way the Academy members might participate in the various health educational activities.

Dr. H. H. Donnally reported that the problem in the District of Columbia is not so complex as it is in some of the states. The District is a large city in itself, the only rural parts participating being the adjacent areas of Maryland and Virginia. The greater part of the Children's Health Work is carried on by the Dispensaries at the children's hospitals.

Dr. Hugh Chaplin reported that the State Child Health Work in New York is unusually well organized. The State Department of Health has an excellent children's division and in all the larger cities, particularly in New York, there are a number of organizations connected with the welfare of children. The problem is rather to determine where there is overlapping with a view to seeing how to attack the problem more efficiently and economically.

Dr. Joseph Stokes, Jr., just having been appointed State Chairman of Pennsylvania reported that he was not familiar enough with the situation to report in any detail as to the possibilities for the Academy's activities in the state of Pennsylvania.

Dr. Ethel C. Dunham felt that in the state of Connecticut the first activity which should engage the activity of the Academy would be a survey of the present facilities of child welfare.

Dr. Fred B. Smith reporting on Maryland, said that he did not doubt the fullest cooperation of the State Department of Health could be obtained and he hoped that at least some of the suggestions made by Dr. Nichols could be put in force in Maryland.

After the state reports, a discussion followed on the stand the Academy should take in regard to advertising by lay firms which contained advice to mothers, a specific example of this being feeding advice given by the makers of certain children's wear. It was the consensus of opinion that some program covering advertising should be advocated by the Academy as a whole.

It was next suggested that in the printing of a new book containing the list of members, that those who are in private practice should have a distinguishing mark for purpose of referrring patients who move away from one district to another.

It was next moved that the Committee of Region I feels that the statements as to the qualifications for membership should, if possible, be more clearly defined.

The following resolution was passed and the Chairman was asked to present it to the Executive Board.

"In view of the abnormally high death rate in colored infants in the United States, that the Academy survey the causes for this and that further with this survey, an investigation be made of all possible means of increasing the educational facilities for colored physicians and nurses."

Report of Region II

Dr. Mitchell reported that a very successful meeting had been held between the pediatricians of Region II and the officers of the State Health Departments. At this meeting a plan was devised for cooperation and committees appointed with representation from both groups, and also from among the obstetricians. The following three committees were appointed, the Executive Committee, the Committee on "What to Do" and the Publicity Committee. This was a very active meeting and showed a marked spirit of cooperation between the two groups. Dr. Mitchell stated that the pediatricians of Region II were glad to be shown just what the Academy was working toward.

The resignation of Dr. Thomas Elwood Buckman of Florida, as State Chairman was accepted with regret.

Report of Region III

It was moved and seconded, that the men holding both regional committee and state chairman positions be relieved of one of these, as it was considered that the two positions were too much for any one man to be asked to handle. With this in mind, the following changes were made.

Dr. Abraham B. Schwartz was dropped from the Regional Committee, but retained as Chairman of the Wisconsin State Committee.

Dr. Julius Hess was dropped as State Chairman of Illinois and retained on the Regional Committee.

Dr. Thomas B. Cooley was dropped as State Chairman of Michigan and retained on the Regional Committee.

Dr. Theodore C. Hempelmann was dropped from the Regional Committee of Missouri, but retained as State Chairman.

Dr. Fred Moore was dropped as State Chairman of Iowa, but retained on the Regional Committee.

Dr. Lee F. Hill was appointed State Chairman of Iowa.

Dr. Franklin P. Gengenbach was dropped from the Regional Committee, but retained as State Chairman of Colorado.

Dr. George E. Baxter was appointed State Chairman for Illinois.

It was moved and seconded that the expenses of the Region III clinical meeting to be held in September, 1933, in Chicago, be met by the Academy. This was passed. It was planned to have Region III and Region II hold a joint meeting every third year beginning in 1934.

A report was made of the meeting of the State Chairmen in Region III and there was a discussion of the duties of the State Chairmen.

Report of Region IV

Dr. Durand was not present but recorded a very successful meeting in San Francisco with a great deal of interest there.

Report of Region V

Dr. Tisdall reporting for Canada stated that until the financial situation cleared, the membership in Canada would not likely be greatly increased.

The Executive Board considered carefully the wording of that portion of the By-Laws which has to do with the qualifications for membership (Article IV, Section I.) It was decided that this be changed to read:

Article IV

Qualifications of Fellows and Proposals for Fellowships.

Section I. Qualifications. A Candidate to be eligible as a Fellow of the American Academy of Pediatrics must meet the following qualifications and requirements:

1. A minimum of five years exclusively in pediatrics.
2. Evidence of fundamental training.
3. Clinical experience and standing as determined by Fellows in his region.
4. Productivity in one or more of the following:
   a. Teaching
   b. Investigative work
   c. Clinical studies
   d. Publications (contributions to medical and other scientific literature)
   e. Public activities related to pediatrics.
5. Governmental activities related to pediatrics shall be considered as proper qualifications for Fellowship.
6. Any exception to the above requirements may be considered by the Executive Board only after a special request by the Regional Committee.

It was moved and seconded that if the Secretary did not receive a favorable reply from a member within one month after his election to membership, his application would be considered lapsed.

Membership

The following were elected to membership:

Region I.

Dr. Walter C. Bacon, 100 20th St., East, Baltimore, Maryland
Dr. Rueben Charles Bates, 122 Waterman St., Providence, R. I.
Dr. Paul Webley Beaven, 26 South Goodman St., Rochester, N. Y.
Dr. Edward L. Benjamin, 2021 Grand Concourse, New York, N. Y.
Dr. Abraham Edwin Bernstein, 12 Silver Lake Road, Staten Island, N. Y.
Dr. T. Terry Burger, 316 Broxton Road, Homeland, Baltimore, Md.
Dr. Jean Crump, 1930 Chestnut St., Philadelphia, Pennsylvania
Dr. Thomas F. Daniels, 1011 N. Charles St., Baltimore, Maryland
Dr. Karl W. Ebeling, 618 Medical Arts Bldg., Baltimore, Maryland
Dr. Albert W. Fellows, 45 Ohio Street, Bangor, Maine
Dr. Edgar Fridenwald, 1616 Linden Avenue, Baltimore, Maryland
Dr. Charles H. Griffin, 404 County Street, New Bedford, Mass.
Dr. James B. Holmes, Cambridge Arms Apartments, Baltimore, Md.
Dr. Geo. Clifford King, 150 Purchase St., Fall River, Mass.
Dr. Fletcher Irwin Krauss, Chatham, New Jersey
Dr. Sandor Levinsohn, 584 Broadway, Paterson, New Jersey
Dr. William London, 255 State Street, Perth Amboy, New Jersey
Dr. Charles F. McKhann, 300 Longwood Avenue, Boston, Massachusetts
Dr. Wm. Francis O'Donnell, 2701 28th St., N. W., Washington, D. C.
Dr. Arthur LeVan Page, 1315 Derry St., Harrisburg, Pennsylvania
Dr. Louis Charles Rosenberg, 11 Murray St., Newark, New Jersey
Dr. Gilbert White Rosenthal, 2311 Eutaw Place, Baltimore, Maryland
Dr. Alma S. Rotholz, 2108 Bolton Street, Baltimore, Maryland
Dr. Alvin E. Siegel, 2015 Spruce Street, Philadelphia, Pennsylvania
Dr. LeRoy T. Stokes, 190 Main Street, Haverhill, Massachusetts
Dr. John D. Sturgeon, Jr., 22 Gallatin Avenue, Uniontown, Pa.
Dr. Carl K. Wagener, 719 Jenkins Bldg., Pittsburgh, Pennsylvania
Dr. Sampson J. Wilson, 208 New York Avenue, Brooklyn, New York

Region II.

Dr. Allan Penny Bloxsom, 4402 Travis St., Houston, Texas
Dr. Russell Conwell Bond, 611-613 Riley Bldg., Wheeling, W. Va.
Dr. Claude McKinley Burpee, 1127 Monte Sono Avenue, Augusta, Ga.
Dr. Jefferson Ralph Lemmon, 211-213 Fisk Med. Bldg., Amarillo, Texas
Dr. Cecil Oliver Lorio, Baton Rouge, Louisiana
Dr. Douglas Dickinson Martin, 906 S. Rome Avenue, Tampa, Florida
Dr. Gilbert S. Osincup, 300 E. Colonial Drive, Orlando, Florida
Dr. Lee Palmer, Heyburn Bldg., Louisville, Ky.
Dr. Warren W. Quillian, Coral Gables, Florida
Dr. Franklin G. Riley, F. G. Riley's Hospital and Clinic, Meridian, Miss.
Dr. Councill C. Rudolph, Power and Light Bldg., St. Petersburg, Fla.
Dr. T. Cook Smith, 321 W. Broadway, Louisville, Ky.
Dr. R. E. Wilson, Leyser Building, Greenville, Miss.
Dr. Gabriel Harold Withers, Aladdin Medical Arts Bldg., Miami Beach, Fla.

Region III.

Dr. William L. Buhrman, 7425 S. Shore Drive, Chicago
Dr. Harold F. Downing, 301 Erckenbrecher Avenue, Cincinnati, Ohio
Dr. Jacob C. Krafft, 3215 North Avenue, Chicago
Dr. Earl W. May, 541 D. Whitney Building, Detroit, Mich.
Dr. Bennett A. Melgaard, 232 Davidson Building, Sioux City, Iowa
Dr. Henry G. Niblack, 6741 Sheridan Road, Chicago

Region IV.

Dr. Joseph Palma, The Clinic, 401 S. Beretania St., Honolulu
Dr. C. Luverne Smith, 1215 Fourth Avenue, Seattle, Washington
Dr. Charles A. Wylie, 303 Professional Bldg., San Bernardino, California

Meeting of Region IV, American Academy of Pediatrics, in San Francisco on October 21 and 22

This meeting was held under the direction of the local members of the Academy and the Chairmanship of Dr. E. B. Shaw. To it were invited all the members of the Northern Pediatric Society and the Northwestern Pediatric Society together with interested members of the Region.

The program consisted of a clinical meeting at the University of California Hospital under the chairmanship of Dr. Francis Smyth where the following program was presented:

1. Soft Curd Milk Feeding, by Myrl Morris and Francis S. Smyth
2. Acrodynia: Case Report by William Deamer with Pathological Report by G. R. Biskind
3. Subacute Bacterial Endocarditis. Report of Case by Amos Christie, Pathological Report by Alfred Heald

The afternoon session of the day consisted of a program at the Children's Hospital under the chairmanship of Dr. C. F. Gelston. The first portion of this program consisted of a discussion of Aspects of Preventive Medicine as promulgated by the American Academy of Pediatrics and initiated in San Francisco through the cooperation of the Children's Hospital. The second session of the program was the following:

1. Metabolic Studies, by Helen B. Pryor
2. Thyroid Function and Dysfunction, by E. B. Shaw
3. Modern View of Epilepsy, by Julian Wolfsohn

The second day's session included a clinical presentation at Stanford Hospital under the chairmanship of Dr. Harold Faber. This consisted of:

1. Clinical Manifestations Associated with Tuberculin Hypersensitiveness by Lloyd B. Dickey

The entertainment features of the program consisted of a luncheon at the St. Francis Yacht Club the first day of the meeting and a dinner which included the business meeting for members only, at the Lakeside Golf and Country Club.

On the second day of the meeting there was a buffet luncheon for the members and their wives at the residence of Dr. Bradford Dearing, then to Palo Alto by motorbus to witness the Stanford versus University of Southern California football game. Riding, golfing and yachting were offered to those members remaining in San Francisco over the week-end.

The attendance at the meeting was approximately fifty members of the Academy. Plans were formulated for the meeting next year and the cooperation of the members in the various districts enlisted in the attempt to keep an active interest in the interval.

Dr. Orville R. Chadwell of Boston, died suddenly on September 30, 1932. He was Professor of Diseases of Children at the Boston University Medical School and a member of the American Academy of Pediatrics.

In the membership list of the Academy, the address of Dr. John C. Baldwin should be 100 East 33rd Street, instead of 1014 St. Paul Street, Baltimore, Maryland.

News and Notes

The first number of the bulletin published by the Maternity Institute of the Beneficence Society of Buenos Aires appeared on the last week of July. Director: Prof. Alberto Peralta Ramos.

On the 18th of June, a Popular Hygiene Exposition organized by the "Children's Hygiene Organization," took place in Rio de Janeiro for the purpose of attracting attention to the various services under its care and at the same time to make known the knowledge of sanitary education regarding the child.

In April, the inauguration of the Second High Course of Pediatrics and Children's Hygiene, organized by Prof. Olinto de Oliveira, Chief of the Children's Hygiene Organization, took place in Rio de Janeiro.

At the session of April 4, 1932, Prof. Olinto de Oliveira took charge as President of the "Brazilian Society of Pediatrics."

The Chilean Review of Pediatrics, of July, 1932, refers to the death of the distinguished and learned investigator, Prof. Rodolfo Kraus, who devoted his energy and his scientific knowledge recognized throughout the world, to the "Bacteriological Institute of Chile."

In July, Dr. Anibal Ariztia, was elected President of the Chilean Society of Pediatrics.

Doctors Victor Escardo y Anaya (Uruguay) and Albert Eckstein (Germany) were elected honorary members of the Society of Pediatrics of Argentina, in its session of July 11.

The Commission for the Protection of the Child and the National League of Hygiene and Social Prophylaxis of Lima, Peru, organized in August, "The Child Week," during which time addresses were transmitted by radio.

In August, Dr. R. Neuhaus was elected President of the Peruvian Society of Pediatrics.

Dr. Antonio Carrau was elected President of the Directive Commission of the Society of Pediatrics of Montevideo during the year 1932, with Dr. Victor Zerbino as Vice-President.

Dr. Julio A. Bauza and Dr. Salvador E. Burghi of Uruguay were made members of the Society of Pediatrics of Paris.

Prof. Luis Morquio was designated an honorary member of the National Academy of Medicine of Argentine; he was admitted during a special public session held by the Corporation, and presented by Dr. Gregorio Araoz Alfaro. During this session, Dr. Morquio discussed the subject "Tuberculosis, Curable in the Child."

The Rolling Clinic for Child Hygiene (Puericulture), intended to survey the rural districts in Uruguay, started its functions the twenty-seventh of September and will render the following services: (1) Medical and obstetrical examinations and consultations on pregnancy; (2) after-birth consultations; all children presented at the clinic will be examined and their weight and height will be taken; written instructions on nourishment will be given; also written sheets and pamphlets regarding child hygiene will be distributed; smallpox vaccination will be performed on those not yet vaccinated; (3) consultations on children of preschool age; children between the age of two and seven years will also be exam-

ined and a special study will be made of their nutritive state and proper nourishment assigned; (4) consultations for students. A medical examination and check-up will be made of all children attending school.

From September 20 to 26, the First Social Congress for the Welfare of the Child took place under the presidency of Dr. Gregorio Araoz Alfaro.

LUIS MORQUIO.

The fifth annual meeting of the **British Pediatric Association** took place at Windermere, on May 3, 1932. Dr. F. John Poynton was in the chair, and for 1933 Dr. Dingwall Fordyce was elected as President. An excellent program of communications had been arranged, and the meeting was thoroughly up to standard. Two papers in particular call for mention: that of Dr. Collis on Hemolytic Streptococci in Acute Rheumatism, in which he briefly summarized the facts that led Dr. Sheldon and himself to conclude that hemolytic streptococci play an integral part in the etiology of rheumatism, and the paper by Dr. Leonard Parsons and J. P. Hawksley on the rôle of yeast in the treatment of anemia. No details need be given of these papers, since the chief features of importance in this work of Dr. Collis' have already appeared in *The Proceedings of The Royal Society of Medicine*, while a paper by Dr. Parsons published in the *Acta Paediatrica* deals with the matter of the latter communication. An extremely interesting discussion took place at the evening session, and was devoted to a consideration of the present state of teaching and study of pediatrics in British medical schools, and the means and methods of improvement, together with the advisability of introducing a Diploma of Pediatrics. This discussion was opened by Dr. Robert Hutchison, after whom Dr. Charles McNeil of Edinburgh spoke. Many members took part in the discussion, as a result of which it was unanimously decided that the first step to improve the teaching was to introduce an examination in pediatrics in the final examination of the student. Four resolutions were then agreed to, and were forwarded to the General Medical Council by Dr. Still and Dr. Poynton. These urged the institution of an examination in pediatrics in the students' final examination. The question of introducing a Diploma of Pediatrics, which might prove useful to men entering the public services, or connected with infant welfare centers, was for the time being left open.

In July the Centenary Meeting of the British Medical Association was held in London. We were glad to welcome many foreign delegates, and the celebrations went off with great success. The President, Lord Dawson, held a reception and dance in the Albert Hall; this was a brilliant function, attended by the majority of members wearing academic dress and decorations. The discussions that took place in the Children's Section were of a high order, and have mostly been published during the course of the last few weeks in the British Medical Journal.

Preparations for the International Congress of Pediatrics, to be held in London next summer, are now being pressed forward, and I understand that the subjects selected for general discussion are: Allergy in Childhood, and The Prophylaxis of Milk-Borne Diseases.

Dr. G. F. Still has recently been elected a Censor of the Royal College of Physicians. This is an honour rightly deserved by this pediatrician of world-wide reputation, and it is interesting to note that, so far as it is possible to ascertain, he is the first pure pediatrist who has been elected a Censor of the College.

During the autumn, the writer had the opportunity of visiting the principal pediatric hospital in Lisbon, Portugal. He was received with great cordiality, and is able to state that, despite the financial difficulties so prevalent throughout European countries at the present moment, they are doing excellent work there, and exhibiting great enthusiasm and interest in pediatrics, although the facilities are far from ideal.

K. TALLERMAN.

J. F. Babinski, the well-known neurologist, died in Paris on October 29, at the age of 75. As a young man, he inclined toward laboratory work but soon was more interested in clinical investigation, being Charcot's favorite pupil. At the age of 36, he described while studying cutaneous reflexes, the symptom known as "Babinski's reflex" which has been accepted as a sign of organic disturbance of the central nervous system. In 1901, he published his book on *Hysteria* and in 1909, another one on *Enumeration of Traditions of Hysteria* leading to the discovery of *Pithiatism* grouping the symptoms curable by mental persuasion.

This discovery was of practical value during the war for the detection of pseudo and incomplete hysteria, of which so many cases were causing an unnecessary overcrowding of the hospitals. This work is all the more to be admired as being contradictory to that of his predecessor Charcot, for whom he always had the greatest admiration. Since the war, he has concentrated on the study of the symptoms of cerebellar perturbation, such as asynergia and adiadocokinesia. By a minute study of reflexes and sensitive disturbances, he was able to detect and localize almost mathematically the site of medullar and cerebral tumors which were first operated in France by such men as Clovis, Vincent and Theo de Martel after methods of Harvey Cushing.

His death will be a loss to his numerous and faithful friends, not only in France but in many countries.

G. ILLINGWORTH HELIE.

A meeting of the **Northwestern Pediatric Society** was held in Rochester, Minnesota, November 5. After luncheon was served at Dr. H. F. Helmholz's home, the scientific program was presented by the staff of The Mayo Clinic.

On December 5, a meeting of the **Northwestern Pediatric Society** was held in conjunction with the Hennepin County Medical Society in which Dr. W. R. Bloor, Professor of Physiological Chemistry and Pharmacology of the University of Rochester, New York, was guest speaker. His address was on lipoid metabolism in various clinical conditions.

Book Reviews

Review of Organization for the Care of Handicapped Children. Report of the Committee on National, State and Local Organization for the Handicapped. White House Conference on Child Health and Protection. Century Company, New York, 1932, p. 432.

The importance of having available adequate health services to all physically, mentally, and socially handicapped children in America and the close interrelationship of health and welfare services are strongly emphasized in the very interesting report of the Committee on National, State and Local Organization for the Handicapped compiled under the able chairmanship of Mrs. Kate Burr Johnson, Superintendent of the New Jersey State Home for Girls.

Summarizing its views on welfare, health and education of the handicapped child, the Committee states that "no program for the care of handicapped children can ignore education and health. Every county or locality should have a board of welfare, a board of health, and a board of education, the three serving the same political unit. The three should be so related and their work so integrated that the full service of each will be available for all handicapped children. No one service should undertake work falling in the province of the others except in general as a temporary expedient."

And as regards nursing and social services, the Committee is of the opinion that both services "are needed in every local area, and whichever service first enters the field should make it a part of its daily program to educate the community to the need of the other service. Nursing service and social service are complements of each other and in no sense rivals in dealing with the ills of humanity."

A sub-committee of the general committee which has been concerned with the history and administration of local public units, has come to the conclusion that the county is generally the most practicable unit for the administration of child care. The Committee felt that "the majority of the problems of handicapped children require study and treatment by an agency which is close at hand. To be effective, service must be immediately available in the neighborhood of the trouble. Only through such close at hand service as can be given by a county agency can an early discovery of the case be assured, with home treatment whenever possible, and the development of preventive measures."

Above these local units for health and welfare is the state which "has a distinct responsibility to see that all its children are protected, given proper support, care, and education, and are provided with opportunity so that each may develop to his fullest capacity. In meeting this responsibility states are brought into relationship with the federal government on the one hand and local governmental bodies and private child caring agencies on the other. It is essential, therefore, that every state have a central authority through which these relationships may be maintained."

The Committee which considered direct care to handicapped children felt that "every state should accept its responsibility for handicapped children by setting up efficient machinery for their proper care, either through the establishment of a pro-

gram of direct care by the state itself or through the stimulation of local agencies, public and private, supervised by the state."

From the standpoint of the medical practitioner, the following points in the program of the Committee on Direct Care are of special interest:

1. "Every state should definitely accept responsibility for institutional care of the training school type for mentally defective and mentally ill children; for the establishment of mental clinics for early diagnosis and treatment in sections where such facilities would be otherwise unavailable, for the establishment of central registration and parole from state institutions, an educational program that will stimulate local communities, special day school classes and adequate supervision, to develop a protective program for the mentally handicapped child not requiring institutional care."

2. "Every state should accept responsibility for the physically handicapped (the deaf, the blind, the crippled) and provide special clinics; a stimulation of special classes in local day schools; statutory authorization of home teachers when necessary; and, if proved necessary, state hospital schools which, in the larger states, shall be developed on a regional basis and shall be equipped with social service and vocational training."

The findings of the Committee on Organization for the Care of Handicapped Children are epitomized in the Children's Charter promulgated by the White House Conference on Child Health and Protection. The charter states that in order to make everywhere available minimum protections of the health and welfare of children, there should be a district, county, or community organization for health, education, and welfare, with full-time officials, coordinating with a state-wide program which will be responsive to a nation-wide service of general information, statistics, and scientific research. This should include:

(a) Trained, full-time public health officials, with public health nurses, sanitary inspection, and laboratory workers
(b) Available hospital beds
(c) Full-time public welfare service for the relief, aid, and guidance of children in special need due to poverty, misfortune, or behavior difficulties, and for the protection of children from abuse, neglect, exploitation, or moral hazard.

WILLIAM J. ELLIS.

Comments

THIS is an open column. Comment regarding any phase of pediatrics or medicine is desired.

THE past six months has seen the Academy passing from a rather nebulous stage into one of clear-cut action and activity. In the fall, meetings of the Regional Committees of Regions I and III were held in New York and Chicago, respectively. Reports from different states, such as those from New Jersey and Iowa, for example, indicate that many state units are active. Region II held a joint meeting with the Health Commissioners of the various southern states in November, and a program of cooperation is being worked out. Region IV held a well-attended meeting in October with a part of the program given over to clinical papers. Region III is arranging for a two-day clinical meeting in Chicago in the fall. The Central States Pediatric Society after seventeen years of active life will not hold their usual fall meeting in 1933, but will be guests at this regional clinical gathering. Over 90 per cent of the active members of the Central States Society are members of the Academy.

The Executive Committee met the last of November in Chicago and passed on approximately fifty applications for membership. Arrangements were decided upon for the annual meeting of the Academy next June. The Committee on Hospitals is at work on a survey of Children's Hospitals, and the Committee on Medical Education is preparing a report on the certification of specialists.

THE JOURNAL OF PEDIATRICS has finished its first volume. The reports of these many activities have been published or will appear in the Journal. We feel the questions as to the need for, the function, and the opportunities of the Academy have been answered in the past six months to the satisfaction of every one. In a recent letter to the members of the White House Conference the Chairman, Dr. Wilbur, gave the final benediction and expressed the view that the work should now be continued through local groups. It would take many pages to tell the story of what has already been done by the Regional and State Academy groups in carrying out not only the recommendations and findings of the Conference, but in keeping active the spirit of Section I—Medical Service.

THE Academy and the Journal will sponsor a "pediatric junket" to England in connection with the third meeting of the International Pediatric Congress, London, July 20-22, 1933. Preliminary details will be given in next month's issue.

THE final report of the five years' study of the Committee on the Costs of Medical Care was made public the last of November. This final report entitled, "Medical Care for the American People" (University of Chicago Press), bids fair to become one of the most important documents in the history of American medicine. The final report carries a majority recommendation and two minority statements. Of the sixteen members representing "Private Practice," seven physicians signed the majority and seven the first minority report. Two dentists in this group signed a second minority report. All members representing the "Public" and all but two of the twelve representing "Institutions and Special Interests" signed the majority report. One each of the six "Public Health" and six "Social Service" groups dissented from the general scope of the study.

The study and report is of such tremendous import to American medicine that it deserves careful study and thought on the part of everyone. Snap judgments and opinions should be avoided. In an editorial the Journal of the American Medical Association has already attacked the majority report. We feel that a careful study and time for reflection is needed before an opinion can be expressed. Opinion is bound to be divided and hospital corridor and lunch table arguments are already under way. Our first thought after a cursory study of the report is that there need be no fear of any immediate changes in medical practice taking place. Further that in the discussions the point of view must be kept in mind that the Committee has studied the subject from the broad viewpoint of the public. So far most of the argument has been as to its effect upon the physician. After all we must remember that any proposed change reflects the changing political, social, and economic conditions which are taking place in every field throughout the world. If these proposed changes are sound they will take place—not abruptly but by evolution—and if they are not sound they will not live even if the attempt is made to put them into effect. The Journal plans to present an analysis of the report in the near future. In the meantime we urge every reader to obtain a copy of the final report and study it carefully.